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THE PAPER INDUSTRY

NOVEMBER, 1935
Vol. 17—No. 8

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

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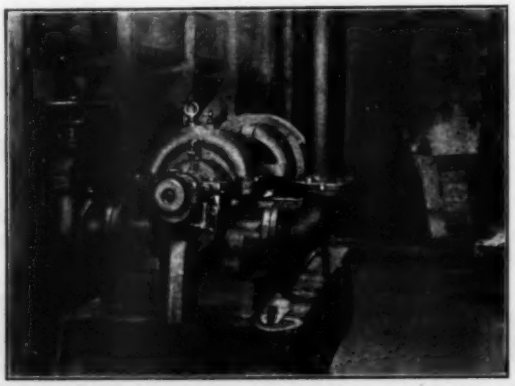

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Paper Business Expanding

THE month of October scored an advance in paper consumption based on the shipments against orders from the mill into the market during the month. A continued enlargement of paper consumption is forecast by the continued expansion in general business.

Every business index shows continued business recovery and reflects the fact that a firm foundation for better business was laid back in the second quarter of the current year.

Most significant are the figures on employment and pay rolls. Factory employment and pay rolls have shown a continuous advance since July, employment expanding 5 per cent and pay rolls more than 10 per cent.

A survey by the National Industrial Conference Board shows that seventeen out of twenty-five industries increased the work week in September as compared with August and preliminary figures for October all tend to show a gain over September.

The expansion of industry is furnishing re-employment which, if continued into next year at the present rate, is sure to bring about the effective return to prosperous conditions.

Every division of the paper industry shows expansion. The only fly in the ointment pot is the announced newsprint advance of $1.00 per ton for 1936. This wholly unjustified price is having a depressing effect upon the groundwood paper industry. However, it may be the means by which the newsprint price and the groundwood paper prices will get relief. Already a number of United States newsprint mills have advised their customers that they will have to find other sources of supply due to the fact that they no longer can continue to absorb the drastic losses incurred by the abnormally low prices of newsprint.

A second factor that may have great influence on changing the newsprint situation is the election of the new administration in Canada. It is already rumored that the incoming administration looks with certain disfavor upon the wholesale depletion of Canada pulpwood reserves at no profit to Canada.

In other divisions of the paper industry, marked activity on the part of buyers has been reflected in the orders received in October. In some of the divisions, large unit mills find themselves entirely sold out. In the kraft paper industry, the situation is particularly strong. The current demand for board and grocery bag paper has practically absorbed the production of the mills south of the Mason and Dixon's line.

In the wrapping paper markets, there are no stocks, no inventories, no surpluses or reserves in any position and as consumers find themselves facing the biggest holiday business in the coming two months with no supplies on hand, they are rushing feverishly to the mills to obtain supplies. The result is that the kraft division finds that it is enjoying a seller's market. Buyers are no longer telling merchants and mills what they will pay, but they are willing to accept the prices at which they can get supplies promptly.

This is a wholesale situation. The paper industry has never made money under a buyer's market regime. The only good money that the paper industry ever made was when it enjoyed a seller's market. We believe that a seller's market will attain from now on and that again is most significant when the general business activity is approximately 67 per cent of normal activity.

The logical question presses for an answer under

present conditions is: if some of the divisions of the paper industry are enjoying a seller's market on a 67 per cent normal business activity, what will happen when business activity rises, as it now seems certain that it will, to a 75 per cent or to an 80 per cent normal activity?

Price advances in certain grades of paper are already announced and it is due to the fact that short sellers and tardy buyers are having to offer advanced prices in order to obtain prompt shipments.

Cold Weather Preparedness

"NEVER leave that till tomorrow which you can do today" is one of the terse and trite sayings of Benjamin Franklin, which is believed by many and practiced by comparatively few. It is so easy for most of us to procrastinate and to put off from day to day the doing of things which ought to be done until what is thought to be some more convenient time. Really, the one thing that brings about accomplishment is sheer necessity, and even that sometimes fails in its purpose.

The story of the farmer who lived in a house with a roof which needed shingling may be recalled. When asked why the job wasn't done, the farmer replied that when it rained he couldn't do it and when it wasn't raining, the roof didn't need it.

So it is with some of the work about a pulp and paper plant. When cold weather of winter is at hand, the work cannot be done; and in the open season, somehow it just does not seem necessary to do it or the work is forgotten in the maze of other activities.

Another winter for many mills is not far away and the chances are that some of the same difficulties of previous winters will have to be met in individual plant operation if conditions relating to such problems haven't been improved.

How about your plant? Did you have some trouble last winter that you figured on avoiding this year by making certain improvements during the spring, summer and fall months? How many items of this kind did you note on your calendar to get done before another closed season for such work? Can you enumerate them or did you fail to keep a record of them?

Perhaps you trusted only to memory and have seen to it that everything you were able to recall has been done; or it may be that you had definite plans for completing all such jobs as seemed necessary but time just hasn't been available for doing them. If you have relied on memory, before it is too late, give additional thought to the difficulties experienced last winter and see to it that nothing which can be done to improve winter operating conditions is overlooked. If time has been at a premium and it has been impossible to get the scheduled work out of the way, there may yet be time to finish the work if a concentrated final "push" is made. In either event, an attempt at least is worth the try as it may result in improved working conditions, reduced operating expense or both.

Why Are We Grateful?

THANKSGIVING DAY is distinctly an American tradition. It is an anniversary that has stood throughout the country's history as a symbol of plenty. And the people of the nation have been blessed as no other nation on earth ever has been.

Through all the changing vicissitudes of world unrest, we again approach the thanksgiving season. The President of the nation has designated November 28th as Thanksgiving Day, ignoring the petition of certain groups to change the date of this time-honored custom for commercial purposes.

The expression "the changing world" has become universal. To the people of a world beset with turbulence of every sort, changing events have become kaleidoscopic and alarming. The reality of their existence has been dimmed by chaotic conditions.

And yet, the earth, created and held in place by an infinite power, is unchanged—the changes affecting humanity are those effected by man himself. Mankind is prone to appraise his possessions and to count their passing as a real loss. But a true consideration of his existence reveals the beautiful fact that the cycle of loss through which he seemingly has passed during recent years has given him the opportunity to understand real blessings. The world *is* unchanged. Notwithstanding devastation in certain sections, the earth at large still blossoms in season, bringing forth that which man needs for his sustenance. Nature still paints her masterpieces and man's intelligence increases with every passing year—his genius has brought him to a high level of existence and power. The human family still maintains that brotherhood which never withholds the cheery smile, the word of encouragement or sympathy, the exchange of knowledge, or the helping hand in time of need.

Man's gratitude, then, should be expressed for the gifts with which he has been endowed and for those things that are infinite and unchangeable. It is a test of his reasoning to understand real blessings, but that achievement never fails to bring infinite protection and plenty.

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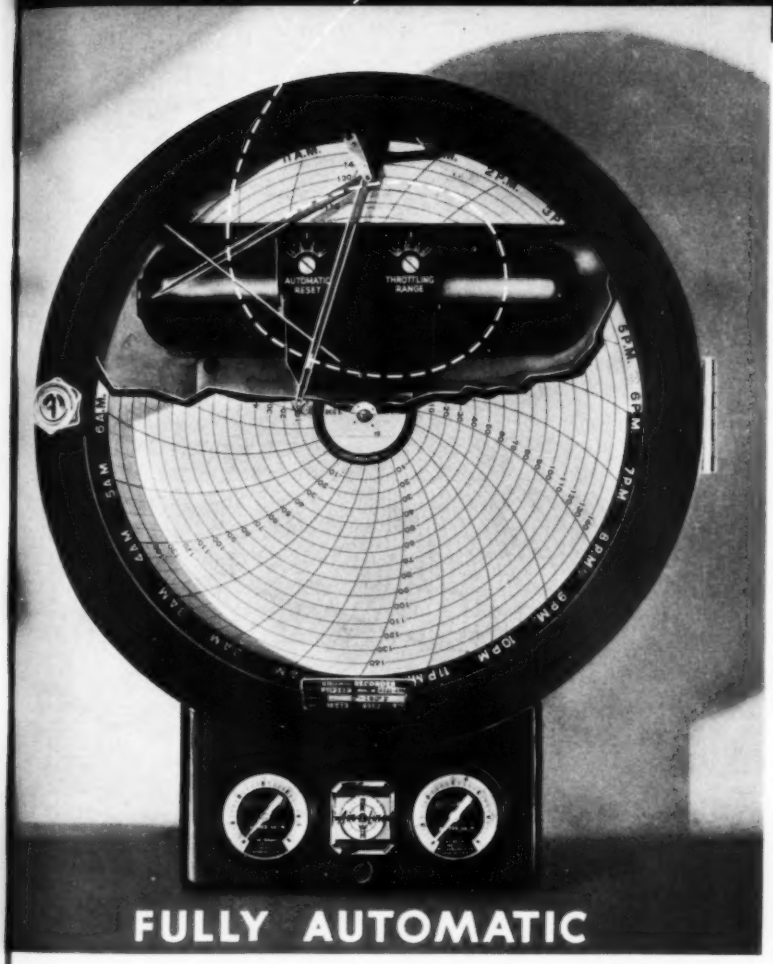

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Brown *AIR-o-LINE* not only confines the process within limits, but it "lines out" control at the exact desired control point, regardless of load or throughput changes. Once it is "Tuned In" it becomes fully automatic.

Brown *AIR-o-LINE* "Recognizes," "Analyzes," "Corrects" for any departure from the exact control setting, without "Cycling," "Drifting," or shifting of the control point.

Brown *AIR-o-LINE* is easily adapted for the control of temperatures, pressures, flows and liquid levels—you can rely on its accuracy—be confident of its dependability.

Modernize your process control with this *Modern* air operated control instrument. Brown *AIR-o-LINE* is more than a controller—it is a *system* that will aid you to reduce costs.

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The graduated dial makes it possible to change the rate at which the control point is automatically reset. No resistance tubing is used, thereby saving the time usually required when rate of reset is changed by varying the length of resistance tubing in the reset mechanism.

Affords a quick and precise means of "tuning in" the *AIR-o-LINE* to exactly meet individual process conditions.

Other features are fully described and explained in Catalog 8900. Write for it.

BROWN AIR OPERATED CONTROLLERS

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A Letter from Lord Macaulay

By WILLIAM SIBLEY

THE following quotations were taken from a letter written by Lord T. B. Macaulay on May 23, 1857. This letter was extremely interesting to me because, from the standpoint of timeliness, it might quite as well have been written yesterday. Read it and see if you don't agree that Lord Macaulay here proves himself an accurate political economist. Note especially the last paragraph:

"I am certain that I never wrote a line and that I never uttered a word indicating an opinion that the supreme authority in a State ought to be entrusted to the majority of citizens told by the head; in other words, to the poorest and most ignorant party of society. I have long been convinced that institutions purely democratic must, sooner or later, destroy liberty or civilization or both.

"In Europe, where the population is dense, the effect of such institutions would be almost instantaneous. What happened lately in France is an example. In 1848 a pure democracy was established there. During a short time there was reason to expect a general spoliation, a national bankruptcy, a new partition of the soil, a maximum of prices, a ruinous load of taxation laid on the rich for the purpose of supporting the poor in idleness.

"Such a system would, in twenty years, have made France both poor and barbarous. Happily, the danger was averted and now there is a despotism—a silent tribute, an enslaved press. Liberty is gone, but civilization has been saved.

"You may think that your country enjoys an exemption from these evils. I will frankly own to you that I am of a very different opinion. Your fate I believe to be settled, though it is deferred by a physical cause. As long as you have a boundless extent of fertile and unoccupied land your laboring population will be far more at ease than the laboring population of the Old World, and while that is the case the Jefferson politics may continue to exist without causing any fatal calamity.

"But the time will come when *New* England will be as thickly populated as *Old* England. Wages will fluctuate as much with you as with us. You will have your Manchesters and Birminghams, and in these Manchesters and Birminghams hundreds of thousands of artisans will assuredly be sometimes out of work. Then your institutions will be fairly brought to the test.

"Distress everywhere makes the laborer mutinous and discontented and inclines him to listen with eagerness to agitators who tell him that it is a monstrous iniquity that one man should have a million while another cannot get a full meal. In bad years there is always grumbling and sometimes rioting. But here, malcontents are firmly yet gently restrained. The bad time is got over without robbing the wealthy to relieve the indigent.

"I have seen England pass through three or four such critical seasons. Through such seasons the United States will have to pass in the course of the next century if not of this. How will you pass through them? I heartily wish you a good deliverance.

"But my reason and my wishes are at war, and I cannot help foreboding the worst.

"It is quite plain that your government will never be able to restrain a distressed or discontented majority. Such will have the rich, who are always a minority, absolutely at its mercy. The day will come when, in the State of New York, a multitude of people, none of whom has had more than half a breakfast or expects to have more than half a dinner, will choose a legislature. Is it possible to doubt what sort of a legislature will be chosen?

"On one side will be a statesman teaching patience, respect for vested rights, strict observance of public faith. On the other will be a demagogue ranting about the tyranny of capitalists and usurists; and asking why anybody should be permitted to drink champagne and to ride in a carriage while thousands of honest folks are in want of necessaries. Which of the two candidates is likely to be preferred by a working man who hears his children cry for bread?

"I seriously apprehend that you will, in some such season of adversity as I have described, do things which will prevent prosperity from returning. There will be, I fear, spoliation. The spoliation will increase the distress. The distress will produce fresh spoliation. There is nothing to stop you. Your Constitution is all sail and no anchor.

"As I said before, when a society has entered on this downward progress, either civilization or liberty must perish. Either some Caesar or Napoleon will seize the reins of government with a strong hand or your Republic will be as fearfully plundered and laid waste by barbarians in the 20th century as the Roman Empire was in the fifth; *with this difference:* That the Huns and Vandals who ravaged the Roman Empire came from without, and your Huns and Vandals will have been engendered within your own country by your own institutions."

THE PAPER INDUSTRY
A MONTHLY EDUCATIONAL JOURNAL

Power Plant Costs In Relation to Production Costs

E. H. BARRY, Power Supervisor
West Virginia Pulp and Paper Company

THE physical complexity of the modern industrial power plant introduces difficulties in the way of adapting a simple accounting system to the needs of the plant. Oftentimes the accountant, being unfamiliar with these complications, evolves an accounting system which either fails to furnish reliable cost information by omitting important factors, or becomes so involved in attempting to include them as to confuse the final result.

Let us take, for example, a typical paper mill producing its own power and steam with modern equipment such as high pressure boilers, bleeder turbines, etc. For economical operation, all steam for cooking, evaporating, drying and heating is used at low pressures, after it has been bled from turbines. Furthermore, hot water where required by the process, is furnished by the power plant in a manner to provide the most favorable heat balance; that is, by using condenser cooling water in low pressure heaters heated by bled steam. Hot water returns from process are sent back to the boiler house feed water heater. Thus advantage is taken of the opportunity of obtaining power from steam before its energy is degraded. Such a plant produces cheap electrical power as compared with a public utility steam plant.

In devising an accounting system for such a plant careful consideration should be given to the purpose which the accounts will serve. One method will aim at arriving at the unit cost of the services of electric power, high and low pressure steam, and hot water, delivered by the power plant and used in the process departments.

To accomplish this, the total cost of operating the power plant for a period can be determined readily by adding together the cost of fuel, labor, repair materials, supplies, supervision, insurance, taxes and other overhead. A difficulty is immediately encountered, however, in allocating this cost to the individual power plant services. The cost of steam in the condition in which it leaves the boiler may be determined without difficulty by segregating the costs of the boiler house from those of the power house. When it comes to calculating the cost of electric power and bled steam, however, consideration must be given to the fact that the cost of each of these is dependent upon the cost of the other; that is, the electric cost depends on the amount of credit allowed for the bled steam and vice versa.

Various methods are used to circumvent this aspect of the problem. Sometimes, in order to encourage the use of bled steam, an arbitrarily low price is set upon it. This price is then considered as the cost of the bled steam, and the cost of power is calculated as the difference between the cost of the steam entering the power house and the credits allowed for bled steam (and hot water). This, of course, does not give a true cost of power, unless the bled steam is considered as a by-product sold to the production department for what it will bring.

Another method of evaluating the bled steam is on the basis of its heat content as compared with the heat content of the steam leaving the boiler house. Inasmuch as there is little difference in heat content

between, say, 200-lb. and 20-lb. steam, this method offers little inducement to the process departments, from the standpoint of steam cost, to use bled steam in preference to high pressure steam. Furthermore, it is often contended that because of the lower temperature of the bled steam, necessitating greater areas in heat transfer equipment for the same production, and the need for larger pipe lines, valves, etc., the final cost to the consumer of bled steam is greater, when figured by this method, than the cost of high pressure steam. The cost of power, however, is reduced by reason of the larger credit for bled steam.

Proper charges for hot water sent to process, and proper credits for condensate returns provide opportunities for further argument as to method of calculating costs.

In selecting any accounting method the controlling factor should be the use that is to be made of the results. Cost accounts in general are for the purpose of furnishing the management with information by which it can operate its business more intelligently and more efficiently.

In the comparatively rare case where a paper mill sells power or steam to an outside customer there is good reason to calculate the separate costs of these items. Where the mill consumes all the output of its power plant it is questionable whether anything is gained by keeping a running account of the cost of high and low pressure steam, electric power and hot water. To be sure, a decision at some time must be made between the purchase of power, and perhaps steam, from an outside producer, and the manufacture of these services in the plant. But such a decision has to be made only at rare intervals and must necessarily be preceded by a special investigation, during which any desired costs can be determined.

It is therefore worth while to consider a simpler power plant accounting system, which, while somewhat unconventional, may give adequate information to the management.

Such a system might lump the boiler house and power house together. Power services are reduced to a common denominator where possible. This common denominator may be the unit of heat (BTU). Thus any service consuming heat units, such as electric power, steam, or hot water can be evaluated in terms of the number of heat units consumed in its production. The cost of producing a unit of heat is calculated by lumping all power plant costs for the period and dividing by the net boiler output of heat units. Fixed charges on the entire power plant, including steam and power distributing lines, may be included in the total cost.

The cost of power is determined by calculating the net consumption of heat units by the prime movers (gross heat units in steam entering turbines and engines minus credits for bled steam and hot water). Credits for condensate and charges for hot water are made on the basis of temperature.

The cost of refrigeration, compressed air, etc., may be figured separately if desired, based on the consumption of power and other direct costs applicable to their production. These may, however, be classed as auxiliary services of the power department, such as service water and as such automatically included in the cost of electric power by calculating the net power output after consumption of power by air and ammonia compressors, service water and fire pumps, etc. Thus no direct charge would be made for these services.

In each accounting period the cost per heat unit produced by the power plant is figured. Appropriate factors are used to convert kilowatt hours, pounds of high and low pressure steam and hot water into corresponding heat units. Metered consumption of these services is then multiplied by the proper factor, thus reducing them to terms of heat units.

To charge power plant expense against each production department, it remains only to multiply the number of equivalent heat units consumed by each department by the previously calculated cost per unit. Depreciation insurance, taxes, etc., are included in the cost of the heat unit so that each department pays its share of these fixed charges according to the number of units consumed.

An objection to this method may be raised on the ground that a consumer of steam only is charged a portion of the fixed charges on power producing equipment. This objection is academically valid, but to accurately segregate the fixed charges applicable to steam only, introduces complications which usually are unwarranted. Most production departments are consumers of power, and any benefit derived from a reduction in the cost of bled steam is offset, at least in part, by an increase in the charge for power.

Many other apparent inequities in the method could be pointed out such, for instance, as the fact that no consideration is given to the fact that a block of heat in high pressure steam might be of greater value to a consumer than an equal block of heat in low pressure steam or hot water. As previously pointed out, however, one must not lose sight of the use to be made of the accounting records.

Two valuable purposes are served by the power plant cost accounts. First, they indicate what portion of the total cost of finished product is attributable to the operation of the power plant. Second, they are the pulse which is felt by the management from month to month to determine the state of health of this department.

Thus far only the entries in the power plant ledger account and postings therefrom to the production department accounts have been considered. Regardless of the particular accounting method adopted, accurate data regarding the operation of the power plant must be assembled if the accounts are to have a real meaning. Recording and integrating instruments for measuring quantity flow of steam and hot water are a necessity. Coal scales are required unless faith is to be placed on railroad weights alone. Recording thermometers and pressure gages on steam lines are needed to determine the average heat content. Thermometers only will measure the heat in hot water.

Regarding the second main purpose of power plant accounts, viz., to indicate the condition of the plant, it is obviously necessary to have suitable instruments in the boiler house and power house by means of which inefficiencies can be discovered and corrected.

The degree of refinement to which instrumentation may go depends entirely on the size of the plant and the dollar value of the savings which can be made by proper interpretation of the records. The purchase of instruments from a reliable manufacturer is no guarantee of sustained accuracy. Instruments must be continually inspected, checked and maintained. The full time services of a meter expert are frequently justified.

In addition to the keeping of suitable ledger accounts adapted to the needs of the mill, another form of account is often of great value in estimating in advance the effect on power plant heat balance of the addition of new processes, replacement of steam drives with motors, installation of waste heat boilers, etc. By this is meant the amount by which the fuel consumption of the power plant will be increased or decreased as a result of the proposed change. The so-called *increment* cost account gives this information very readily. This account, which is little more than a memorandum, assigns a value to high and low pressure steam, hot water and electric power, which is based on those cost items which vary directly with the quantity of these services produced. The principal item of the increment cost is fuel. Labor, maintenance and supplies enter only to a negligible extent. Fixed charges are neglected, since they are a continuing expense unaffected by small increments of power plant production.

The increment cost of electric power is calculated by assuming that the additional power load is carried by the least efficient prime mover on the line. This is usually a condensing turbine, but might be a non-condensing engine exhausting to the atmosphere. Perhaps it is a Diesel engine.

Assuming it is a condensing turbine, the amount of steam required to produce a kilowatt hour with this machine is calculated from its known water rate. The fuel cost of the additional steam is then computed, to which is added any known direct costs. The sum of these items constitutes the incremental cost per kilowatt hour. In other words, it represents the direct expenditure in the power plant required to produce an additional kilowatt hour over and above normal production.

In calculating the incremental cost of bled steam two factors must be considered, first the additional quantity of steam to be bled from the turbine; second, the power produced by the additional quantity of bled steam. Inasmuch as the total electrical load is constant, there will be a reduction in the quantity of steam to the turbine condenser by an amount equivalent to the extra power produced by the incremental quantity of bled steam. Thus the increased demand on the boilers will amount to the increased demand for bled steam, diminished by the reduction in steam to the condenser. The cost of the additional steam from the boilers represents the incremental cost of the bled steam.

It is to be understood that the incremental costs can be applied equally as well to a reduction in the use of steam and power as to an increase in their consumption.

An example will illustrate the point. Suppose the incremental costs of power plant services are—

Electric Power.....$60 per kilowatt year
200-lb. steam .....$1400 per 1000 lb./hr. per year
10-lb. steam .....$800 per 1000 lb./hr. per year

Now suppose it is contemplated to put in a by-product department which will require 500 kilowatts of electric power and 12000 lb./hr. of 200-lb. steam. The process is of such a nature that waste products can be burned under low pressure boilers, producing 2000 lb. per hour of 10-lb. steam.

Incremental Charges—	
500 KW @ $60	$30,000
12000 lb./hr. 200-lb. steam @ $1400 per M	16,800
	$46,800
Incremental Credit—	
2000 lb./hr. 10-lb. steam @ $800 per M	1,600
Net incremental charge	$45,200

This result shows that as a result of the establishment of the new department the cost of operating the power plant will be increased by $45,200 per year.

This same result could not have been arrived at by directly applying present-day costs per unit of electric power and steam because these costs will change after the new department is in operation. If the power consumed by the new department is in excess of that which is produced by the bled steam the department consumes, then the cost per kilowatt hour will be increased.

Similar devices may be used to facilitate quick cost analysis depending upon individual plant conditions. No universal rule can be devised.

It should be repeated that the accounting system for any plant should be designed to fit the needs of the management of that particular plant. It is as much an engineering as an accounting function to adapt the system to the peculiar features of the power plant.

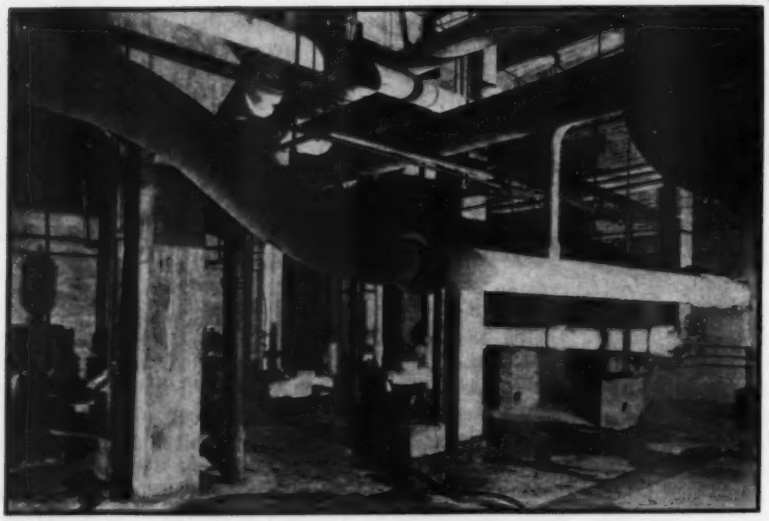
◆ ◆ ◆

Effects of Fumigants on Paper

In Research Paper 828 in the September number of the National Bureau of Standards *Journal of Research*, it is shown that the valuable records of the Government can be fumigated to rid them of book worms without danger of injury to the documents, according to recent findings at the National Bureau of Standards. Several commercially available fumigants, known to be deadly to destructive insects often associated with old books and documents, were found to be harmless to paper in a recent study. Hence, the Government can safely use these chemicals to rid valuable records of book worms before preserving them in its new model depository, the National Archives Building. In investigating the action of the gases used for killing insects, the government scientists fumigated representative papers in a gas chamber at the Bureau of Entomology, in the Department of Agriculture, and determined the effects of each gas by chemical and physical tests of the papers. Hydrocyanic acid gas, carbon disulphide, ethylene chloride-carbon tetrachloride, ethylene oxide-carbon dioxide, and methyl formate were used without injury to the papers.

Modern Heat Insulation

in the Pulp and Paper Industry



G. E. GRIMSHAW, Manager
Industrial Insulation Department
Johns-Manville Corporation

◆

Insulated steam lines
in a Wisconsin paper mill

MOST experts in the field of tracking down and exposing the proverbial silver linings which are supposed to accompany all dark clouds seem to agree that the depression has provided a breathing spell during which general industry has had time to take stock, to develop improved and more efficient methods of turning out a better line of products, and to lay important and well organized plans for the future.

To be sure in a majority of instances it also has delayed the putting of these new plans into effect and, in fact, too often has been responsible for the postponement of even the most needed plant improvements until today there has been built up a tremendous back log of work which needs to be done.

However, there is evidence now that the tide has turned. The pulp and paper industry in recent months has produced its share of plant modernization programs and there is every reason to believe that the immediate future will bring on many more. Perhaps the next few years will witness wholesale changes throughout this branch of industry. What, then, will be the effect of all this program of modernization upon the problem of heat insulation?

The answer is, that it will affect it basically not at all. Specifically, and particularly where such modernization brings with it the operation of equipment at higher steam pressures, it will create a need for increased alertness on the part of the plant engineer to insure that insulation he applies is *at all times adequate to meet the conditions under which it will serve.*

The thing of paramount importance in insulation today, as it always has been and doubtless always will be, may be summed up in the one word *adequacy.* If the insulation conforms to this one test, there will be no danger here, at least, from those unseen and costly leaks which too many times can devour the profits of an otherwise perfectly equipped and well operated plant.

Perhaps the most significant development in the science of insulation during the depression years—the most significant at any rate from the standpoint of insuring adequacy of insulation—has been the improvement in laboratory equipment for the measurement of heat transfer. Of course, there also has been constant improvement in the insulating materials themselves—in their efficiency and in their ability to withstand higher temperatures and the rigors of hard service. But without the ability to measure accurately the efficiency of these materials there could be little progress.

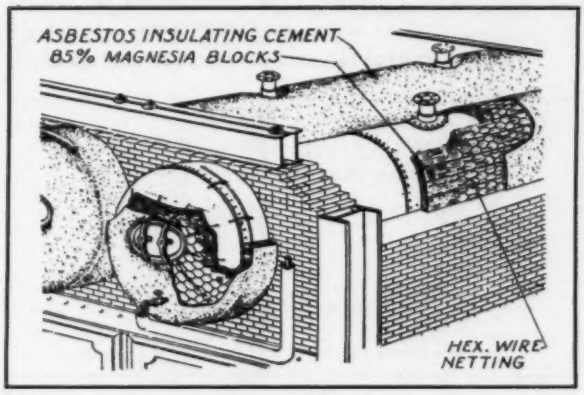
Today, therefore, a dependable manufacturer of insulating materials who has kept abreast of advanced ideas of product design and who maintains a fully equipped thermal conductivity laboratory for evaluating his materials, can supply the modern plant engineer with very definite and tangible information with which he can remove every element of guesswork in the specification of amounts and types of insulation to insure completely adequate protection in his plant against the useless waste of heat.

That, briefly, is the modern picture as expressed in generalities. Let us continue from here by being a little more specific.

The trend toward higher steam pressures in connection with modernization programs in pulp and paper mills places a special premium on thorough investigation of the adequacy of existing pipe insulation. Increased pressures almost invariably demand re-insulation of piping if full benefit is to be derived from modernization. While existing insulation on lines in which the pressure has been stepped up still will perform a degree of service, the new job is usually more than that for which the insulation was designed and

more than it can handle. Consequently, any benefits derived from the modernization will be tempered by higher fuel costs and less efficiency in steam transmission unless new and adequate insulation also is installed.

The economical thickness of any insulation is ordinarily computed on the basis of fuel costs and operating conditions; i. e., insulation is used to prevent the transmission of heat only to the point where it is economical to stop such transmission. Sometimes, however, special conditions, such as the need for accurate temperature control, necessitate thicker insulation than would be warranted otherwise.



Method of insulating boiler drums

Any discussion of insulating heated surfaces well may begin in the boiler room. Here there are a variety of surfaces which should be insulated and almost as many different means of treating them. Among the equipment which should be insulated, if maximum amount of good is to be obtained from the fuel, are boiler furnaces and settings, boiler shells and drums, feed-water heaters, pump cylinders and chests.

For insulating all of this equipment, with the exception of the boiler-furnace or settings, 85 per cent magnesia blocks or lagging for many years have been recognized as the most generally satisfactory material. Under actual service conditions it has proved itself to be the most efficient insulation of the moulded type for temperatures below 600 deg. Fahr. It contains a maximum of minute confined-air cells which increase its natural resistance to heat transmission and reduce its weight.

H. R. T. boilers and the drums of water-tube boilers are almost invariably insulated with 85 per cent magnesia. Except where special conditions may exist, the following thicknesses will be found most economical:

Steam Pressure	Thickness of 85 per cent Magnesia
Up to 25 lb.	1 inch
25 to 100 lb.	1½ inch
100 to 200 lb.	2 inch
More than 200 lb.	2½ inch

Though an uninsulated boiler drum is almost unheard of today, few realize the extent of the savings which may be effected by an adequate insulation job. One study, itemized below, disclosed that insulation entirely paid for itself in approximately three and one-half months and then paid the neat dividend of $36.94 per month for every month of its life, or the life of the boiler drum, thereafter.

The following is the detailed account of this study:

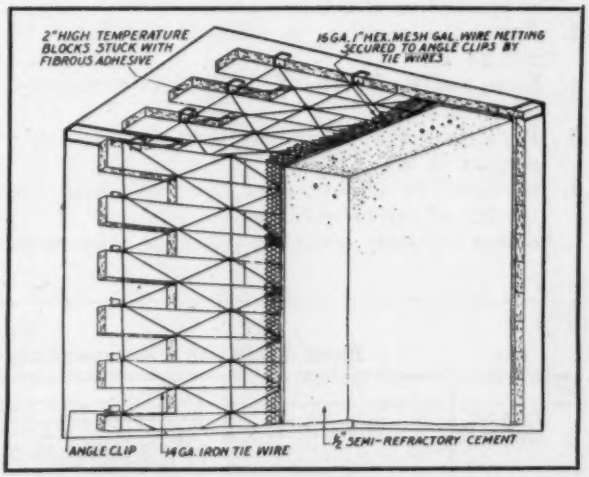
Conditions

Operating temperature	366 deg. Fahr.
Room temperature	86 deg. Fahr.
Thickness of insulation (85 per cent Magnesia with cement finish)	2 inches ½ inch cement finish
Cost of heat, per million B.t.u.	$.30
Operating time per month	600 hours
Area to be insulated	250 sq. ft.
Cost of insulation per sq. ft. applied	$.50

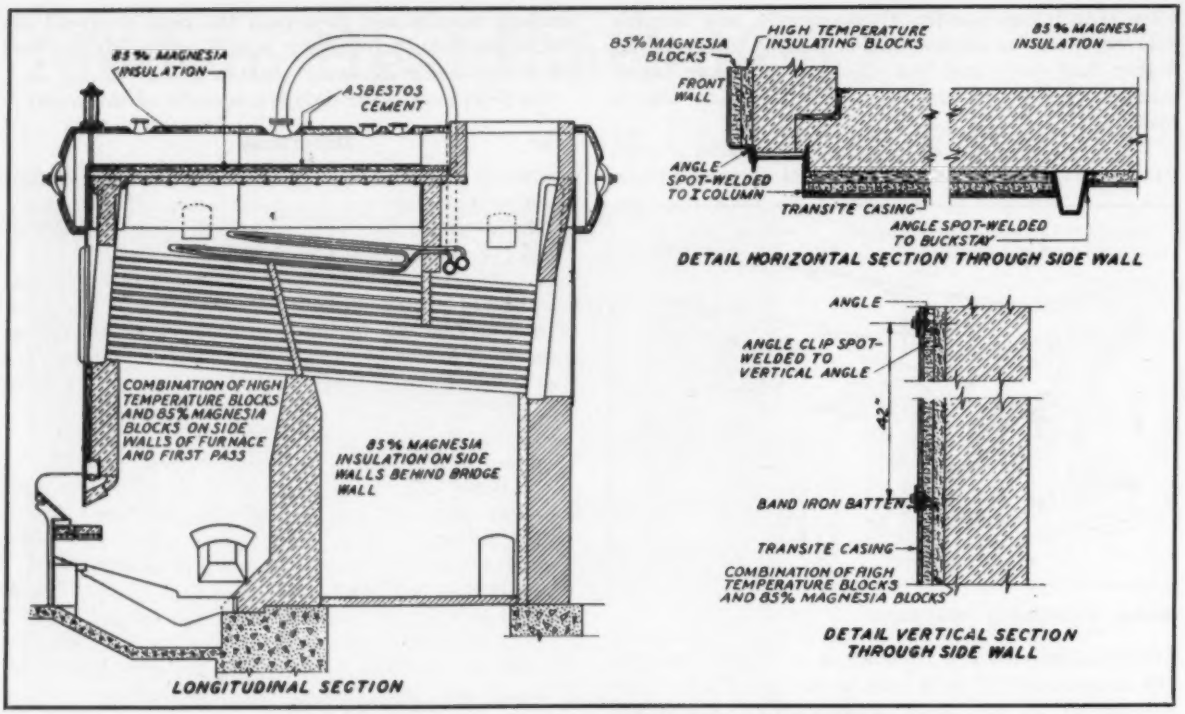
Costs

1. Heat loss (B.t.u. per sq. ft. per hr.) (Bare)	880
2. Heat loss (B.t.u. per sq. ft. per hr.) (Insulated)	59
3. Cost of heat loss (per 250 sq. ft. per month) (Bare)	$ 39.60
4. Cost of heat loss (per 250 sq. ft. per month) (Insulated)	$ 2.66
5. Cost of insulation applied (per 250 sq. ft.)	$125.00
6. Gross monthly saving (Item 3 minus item 4)	$ 36.94

A cash investment of this kind pays large dividends as is shown. Many industrialists, however, are taking up deferred payment buying for the first time because of the remarkably low carrying charges made possible by the Federal Housing Administration. The F. H. A. modernization credit scheme under which a number of large manufacturers are now equipped to finance sales, has recently been enlarged so as to include modernization work in industrial plants in amounts up to $50,000. Under such a plan of buying, if applied to the instance at hand, the insulation would not only pay for itself out of savings without ever calling for a penny of capital outlay, but return a monthly dividend in addition, in the following manner:


2" HIGH TEMPERATURE BLOCKS STUCK WITH FIBROUS ADHESIVE
16 GA. 1" HEX. MESH GAL. WIRE NETTING SECURED TO ANGLE CLIPS BY TIE WIRES
ANGLE CLIP
14 GA. IRON TIE WIRE
½" SEMI-REFRACTORY CEMENT

Method of lining breeching with high temperature insulating blocks


85% MAGNESIA INSULATION
ASBESTOS CEMENT
COMBINATION OF HIGH TEMPERATURE BLOCKS AND 85% MAGNESIA BLOCKS ON SIDE WALLS OF FURNACE AND FIRST PASS
85% MAGNESIA INSULATION ON SIDE WALLS BEHIND BRIDGE WALL
LONGITUDINAL SECTION
85% MAGNESIA BLOCKS
HIGH TEMPERATURE INSULATING BLOCKS
85% MAGNESIA INSULATION
FRONT WALL
ANGLE SPOT-WELDED TO I COLUMN
TRANSITE CASING
ANGLE SPOT-WELDED TO BUCKSTAY
DETAIL HORIZONTAL SECTION THROUGH SIDE WALL
ANGLE
ANGLE CLIP SPOT-WELDED TO VERTICAL ANGLE
42"
BAND IRON BATTENS
TRANSITE CASING
COMBINATION OF HIGH TEMPERATURE BLOCKS AND 85% MAGNESIA BLOCKS
DETAIL VERTICAL SECTION THROUGH SIDE WALL

Method of insulating typical horizontal, longitudinal drum boilers

If purchased on a deferred payment plan, it works out like this:

A. No down payment..... .....
B. Monthly payments for 12 months.....$10.88
C. Monthly profit (item 6 minus item B).....$26.06

Profits from Installation

The application of this insulation:

1. Earns the monthly payment of $10.88 for 12 months.
2. Earns $26.06 monthly IN ADDITION to monthly payment.
3. Pays for entire installation in 12 months with a surplus of $312.72.
4. Earns $36.94 monthly, after 12-month period, for the life of the boiler drums.

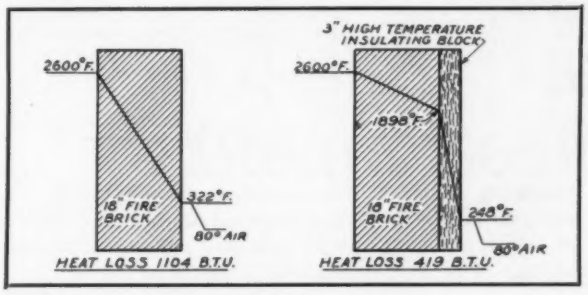
Another necessary insulation job in the boiler room is that of covering the boiler furnace or setting. Insulating the outside of solid fire brick settings saves fuel, reduces air infiltration and assures better working conditions. Added to this is the decrease of internal strains and reduction in spalling because of the smaller temperature differential between the inside and outside of the refractory. Insulation placed over exterior brickwork promotes heat flow along the walls, and the back passes are raised to a higher temperature. Wall cracks, caused by uneven expansion and contraction, are fewer and smaller.

Opposite the furnace and first pass of water tube boilers, temperatures outside the refractory are usually too high to permit the use of 85 per cent magnesia unless it is protected by an inner layer of high temperature diatomaceous silica insulating blocks. This latter material, suitable for tempera-

Table I
Block Insulation Recommendations for Typical Water-Tube Boilers

Type of Boiler	Front Wall	Side Walls		Rear Wall	Top
		From Front Wall to Bridge Wall	To rear of Bridge Wall		
B & W	1½" High Temperature Blocks 1½" 85% Magnesia	1½" High Temperature Blocks 1½" 85% Magnesia	1½" Magnesia (1 layer)	None	2½" Magnesia (1 layer)
Stirling	1½" High Temperature Blocks 1½" 85% Magnesia	1½" High Temperature Blocks 1½" 85% Magnesia	3" Magnesia (2 layers)	1½" Magnesia (1 layer)	1½" High Temperature Blocks 1½" 85% Magnesia
Springfield	None	3" High Temperature Blocks		3" High Temperature Blocks	1½" High Temperature Blocks 1½" 85% Magnesia

tures as high as 1900 deg. Fahr., is used either alone or in combination with 85 per cent magnesia, applied as a veneer layer over the refractory brickwork and finished with cement or with a transite or steel casing. (Transite is a hard, durable, rigid building sheet which is made of portland cement and asbestos fibres combined under high pressure.) The types of insulation and thicknesses generally recommended for various types of solid refractory walls are shown in Table I.



Temperature gradients and heat losses through typical insulated and uninsulated boiler furnace walls

If brick shapes are preferred diatomaceous silica brick are laid up, either bonded or unbonded, on the exterior of the fire brick. In "core wall" construction, the diatomaceous silica brick are built-in as a core between the fire brick and an outer wall of red brick.

The more modern types of water cooled boiler furnace walls also are insulated, usually with blocks or cement or a combination of the two.

While the advisability of insulating smoke flues and breechings is now quite generally recognized, there is some difference of opinion as to whether the insulation should be external or internal. Often the size and location of the flue will eliminate one possibility, as where a man cannot work inside, and the insulation is necessarily placed outside. Outdoor ducts, on the other hand, should be insulated on the inside if it is in any way possible. One effective method of interior lining is shown in the drawing.

The insulation of bare metal surfaces where steam or hot water is in contact with the metal is even more important than insulation over brickwork. Savings in fuel costs effected by the insulation of steam pipes equal or exceed economies brought about by the insulation of boiler drums. The following outline tells its own story in this regard:

Savings Effected by Insulation on Steam Piping

Based on a 6 in. steam line operating at 100 lb. gauge pressure under the following conditions:

Steam temperature	338 deg. Fahr.
Insulation	1½ in. 85 per cent magnesia sectional insulation finished with extra jacket of 8 oz. sewed canvas.
Cost of heat per million B.t.u. (approximately equal to 1000 lb. of steam)	$0.40
Hours operation per *month*	730
Approximate cost of insulation, applied per lin. ft.	$0.88

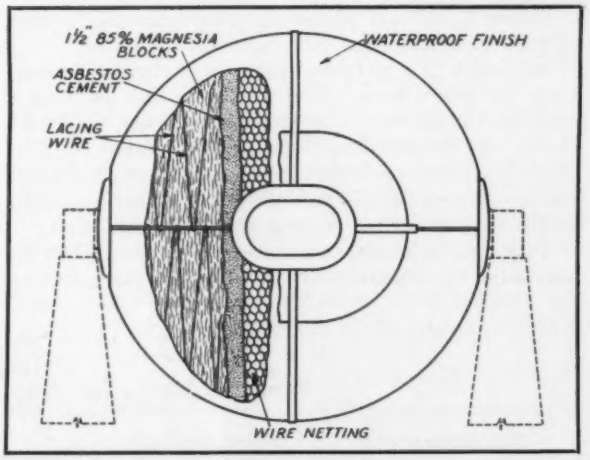
Tabulation of Heat Saving

B.t.u. loss per lin. ft. per hr.—Uninsulated	1380
B.t.u. loss per lin. ft. per hr.—Insulated	153
Cost of heat loss per 100 lin. ft. per *month*—Uninsulated	$40.30
Cost of heat loss per 100 lin. ft. per *month*—Insulated	4.46
Approximate cost of insulation, applied, per 100 lin. ft.	88.00
Approximate gross *monthly* saving per 100 lin. ft.	35.84

The fact that the insulation pays for itself so quickly, that is, in about 2½ months, proves that it is wasteful to allow steam surfaces to remain bare even for a short period. Insulation of flanges also pays a high return on the investment.

One of the most efficient commercial insulations for pipes conveying hot liquids or steam at temperatures not exceeding 700 deg. Fahr. is made of felts composed of asbestos fibres and small particles of spongy cellular material. It is known as asbesto-sponge felted. Built up in laminations, with 40 individual layers of felt per inch of thickness, the remarkable efficiency of this type of material is due to the great amount of entrapped dead air and the many surfaces interposed in the path of heat flow.

This insulation has the distinct advantage of being able to withstand rough treatment. Its tightly laminated construction of tough asbestos felts gives it sufficient mechanical strength to withstand severe vibration and usage. It maintains its high insulating value unimpaired over long periods of time and it can be taken off and placed on other pipe without deterioration or loss of efficiency. This sponge felted type of material is particularly valuable for outdoor lines and for such purposes is finished with an integral waterproof jacket.



Method of insulating Biggs Globe Rotary Bleaching Boiler

For insulation of steam lines indoors and where it is not subject to mechanical injury 85 per cent magnesia pipe insulation is recommended for temperatures up to 600 deg. Fahr. It is light and efficient and still ranks as a highly satisfactory pipe insulation material.

Table II
Recommendations for Temperatures to 600 Deg. Fahr.
(Magnesia or Asbestos-Sponge Felted)

Thickness of Insulation J-M 85% Magnesia			Temperature Deg. Fahr.	Thickness of Insulation Asbestos-Sponge Felted		
Pipes larger than 4"	Pipes 2" to 4"	Pipes smaller than 2"		Pipes larger than 4"	Pipes 2" to 4"	Pipes smaller than 2"
Std.	Std.	Std.	below 212	1"	1"	1"
Std.	Std.	Std.	212 to 266	1"	1"	1"
1½"	Std.	Std.	267 to 337	1½"	1"	1"
2"	1½"	Std.	338 to 387	2"	1½"	1"
Dbl. Std.	2"	1½"	388 to 499	2½"	2"	1½"
3"	Dbl. Std.	2"	500 to 599	3"	2½"	2"
			600 to 700	3½"	3"	2"

For superheated steam lines at temperatures exceeding 600 or 700 deg. Fahr. a combination of either of the two above types with a sectional insulation material made from calcined diatomaceous silica is recommended. This special high temperature pipe insulation product is made from the same material as are the brick and blocks previously mentioned in connection with the insulation of boilers and boiler walls. When applied in combination with sponge-felted or 85 per cent magnesia insulation, the diatomaceous silica product is placed next to the metal surface and either of the other two materials is then added as the outer layer. This method permits utilizing the high temperature resistance of the diatomaceous silica insulation and the economy which results from the superior insulating value of 85 per cent magnesia or sponge-felted.

Tables II and III present recommended thicknesses of pipe insulation for various steam pressures.

Insulation in a pulp and paper mill should not stop with the steam lines. That would be like building a complete house with the exception of one wall. If money can be saved and efficiency increased by adequate insulation on boilers, boiler room equipment and pipes, the same should, and does, hold true with regard to the various heated equipment in the mill itself.

Take, for example, what may be accomplished by insulating a standard 14-foot Biggs globe rotary bleaching boiler. The following data present an analysis of the heat loss from an uninsulated boiler of this type together with heat and equivalent money savings to be accomplished by insulation:

Data:

1. Apparatus Type—14 ft. diameter Biggs Globe Rotary Bleaching Boiler.
2. Boiler surface subject to insulation, sq. ft. 585
3. Average assumed steam temperature in boiler, deg. Fahr. 287
4. Average assumed room temperature, deg. Fahr. 70

Calculations:

5. Temperature difference between boiler and room, deg. Fahr. 217
6. Heat loss boiler uninsulated, B.t.u./sq. ft./hr. 597
7. Heat loss boiler insulated, B.t.u./sq. ft./hr. 57
   (1½ in. 85 per cent Magnesia blocks with cement finish)
8. Heat saving by insulation, B.t.u./sq. ft./hr. 540
9. Heat saving per cook of 7 hours, B.t.u./sq. ft./hr. 3780
10. Latent heat of steam at 40 lb. ga., B.t.u./lb. 919

Table III
Recommendations for Temperatures Above 600 Deg. Fahr.

Temperatures	600-699 deg. Fahr.		700-799 deg. Fahr.		800-1000 deg. Fahr.	
Pipe Size	Thickness of Insulation		Thickness of Insulation		Thickness of Insulation	
	High Temperature Diatomaceous Silica	85% Magnesia	High Temperature Diatomaceous Silica	Asbestos-Sponge Felted or 85% Magnesia	High Temperature Diatomaceous Silica	Asbestos-Sponge Felted or 85% Magnesia
1½" and smaller	2"	.....	2"	.....	2"	.....
2"	1¼"	1½"	1¼"	2"	1 15/16"	1½"
2½"	1 5/16"	1½"	1 5/16"	2"	1 13/16"	1½"
3"	1 9/16"	1½"	1 9/16"	2"	2 1/16"	1½"
3½"	1 5/16"	1½"	1 5/16"	2"	1 13/16"	1½"
4"	1 9/16"	1½"	1 9/16"	2"	2 1/16"	1½"
4½"	1 5/16"	2"	1 5/16"	2½"	1 13/16"	2"
5" and larger, approx.	1½"	2"	1½"	2½"	2"	2"

11.	Steam saving per cook, lb./sq. ft.....	4.11
12.	Total steam saving per cook per boiler, lbs.	2404
13.	Money equivalent of steam saving in item No. 12 ..... (Steam cost assumed at $.50 per M lb.)	$1.20
14.	Yearly money saving due to insulation.. (Assume 6 cooks per week for 52 weeks)	$374.00
Results:		
15.	Total approximate insulation cost per boiler	$450.00
16.	Gross yearly saving per boiler.....	374.00
17.	Annual fixed charges ..... (Assumed at 25 per cent based on 5 year amortization)	113.00
18.	Net yearly saving per boiler.....	261.00
19.	Net yearly return on investment.....	58%

These calculations are conservative because the heat losses are estimated on a "still air" basis and the life of the insulation has been figured at the low value of only five years. The method of insulation on which these calculations were based is shown by the illustration on page 569.

Steam Leak Nomograph

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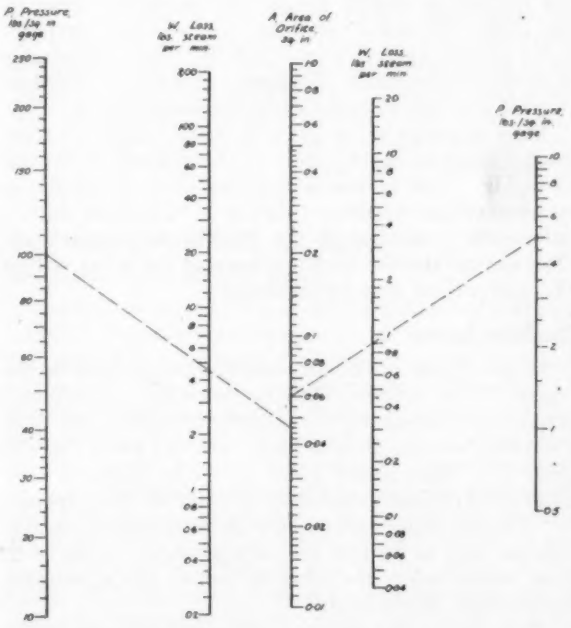
Dale S. Davis' Associates

IN connection with heat and material balances chemical engineers have frequent occasion to estimate the extent of steam losses due to leakage to the atmosphere from both high and low pressure lines. It is the purpose of this brief article (1) to present a convenient alignment chart which enables rapid calculation of the rates of steam losses to the atmosphere



and (2) to show how the well-known Napier and Rankine steam flow equations can be rearranged to deal with gauge pressures in place of absolute pressures. The use of gauge pressures results in considerable simplification in the case of the Rankine expression when applied to flow to the atmosphere.

The use of the chart may be illustrated as follows: Assuming orifice flow, how much steam will be lost in one minute through an aperture having an area of 0.046 square inches when the pressure of the steam is 100 pounds per square inch, gauge? Connect 0.046 on the A-scale (center) with 100 on the P-scale at the left and read the rate of leakage on the W-scale in the left half of the chart as 4.5 pounds per minute.

Exhaust steam at a gauge pressure of 5 pounds per square inch is leaking around a worn fitting. What will be the rate of loss of steam if the area of the opening is 0.06 square inches? As indicated by the broken line in the right half of the chart connect 0.06 on the A-scale with 5 on the P-scale at the right and read the desired value on the W-scale in the right half of the chart as 0.90 pounds of steam per minute.

The nomograph is based upon the Napier and Rankine formulas for the flow of steam and takes proper cognizance of the ranges of applicability of each. The left half of the chart has its origin in Napier's equation which may be written as

$$W = \frac{6}{7} A (P + 14.7)$$

where W = rate of flow of steam, pounds per minute
A = area of the orifice, square inches
and P = gauge pressure, pounds per square inch.

This expression is applicable for office flow whenever the upstream absolute pressure is equal to or greater than 5/3 the downstream absolute pressure, or in the case of flow of steam to the atmosphere, when the absolute pressure in the line is equal to or greater than 5/3 x 14.7 or 24.5 pounds per square inch, or about 10 pounds per square inch, gauge.

The right half of the chart is predicated upon Rankine's equation,

$$W = 1.74 A \sqrt{P_2 (P_1 - P_2)}$$

where P_1 and P_2 are the upstream and downstream absolute pressures, respectively, in pounds per square inch, and where W and A have the same significances as before. In the case of leakage to the atmosphere

$$P_2 = 14.7$$

and substituting this value in the Rankine expression we have,

$$W = 6.67 A \sqrt{P_1 - 14.7}$$

Now, $P_1 - 14.7$ is equal to the gauge pressure, P, of the steam so that

$$W = 6.67 A \sqrt{P}$$

which is a simplified Rankine expression specific for flow of steam to the atmosphere.

Purified Steam Economics

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University of Illinois

TWENTY thousand dollars a year loss in power production due to turbine blade deposits; ten thousand dollars for turbine maintenance due to corrosion; ten thousand dollars for replacement of corroded pipes and fittings. Such items often may be found in power plant records and all are traceable to the presence of impurities in the steam being generated. In many instances, these losses may be prevented by proper water treatment.

In the early days of utilization of steam for industrial purposes there was practically no differentiation between quality and purity of the steam. Steam was being furnished from low pressure boilers which operated at low ratings and the excessive moisture in the steam system was removed by means of traps. Such terms as carryover, superheat, conductivity, turbine blade deposits, superheater deposits, corrosion of steam lines, etc., seldom were used. The term quality merely referred to the amount of moisture in the steam and had no bearing on the impurities in this moisture, or the gases present in the steam. As the various industries started to check the cost of production of their respective products, the items of steam and power costs received more and more attention. As a result, the boiler room is no longer the unknown cost item in the industry. In order to reduce the cost of steam and power the latest developments in steam and power generation have been applied. This has involved the use of higher steam pressures, higher temperatures for superheated steam, steam turbines, high pressure evaporators, better controlled boiler feed water treatment, etc. In line with these changes has come the demand for purified steam. The term purified steam refers to a steam which will not cause difficulties when used to perform its many tasks.

Impurities in steam may be causing the expenditure of large sums of money each year without the management realizing why this money is being spent. These impurities may cause many apparently inexplainable difficulties, while quite often the trouble may be traced easily. The following difficulties may be caused by impure steam:

1—Excessive superheater maintenance
2—Losses in turbines operation or increased maintenance
3—Increased maintenance of steam and condensate return piping
4—Contaminations of manufactured products

Any one of these difficulties could increase production costs at an alarming rate.

Preliminary to a discussion of these difficulties it would be advisable to mention the various impurities that might be found in the contaminated steam. The steam may be contaminated with the boiler water or by gases generated from the boiler water. Boiler water usually contains the following materials: calcium, magnesium, sodium, silica, carbonate, hydroxide, aluminum, iron, chloride and sulphate. The gases which might be present in the steam are: oxygen, carbon dioxide, sulphur dioxide, hydrogen sulphide, ammonia and organic materials. To discuss the losses incident to each of these materials throughout the steam cycle in any one industry would require a lengthy article. However, it is possible to mention briefly the major difficulties which might occur.

Superheater Maintenance

If excessive moisture is present in the steam, this moisture must be evaporated in the superheater if desired superheat temperatures are to be maintained. When the boiler water is carried into the superheater and evaporated, the solids will remain behind and cause deposits to build up. This in turn retards heat transfer with a subsequent increase in the temperature of the superheater steel. With sufficient amount of deposit formed in the superheater the steel is overheated and the superheater burns. This necessitates a shutdown of the boiler and the replacement of the superheater element. Solids present as a finely divided mass in the boiler water also may cause overheating when they lodge in the superheater. Oxygen entering the boiler with the feed water due to insufficient deaeration ahead of the boiler will cause corrosion at the higher temperatures in the superheater which in turn necessitates frequent replacement. Hydrogen sulphide or sulphur dioxide also would cause excessive maintenance.

Even excessive moisture in the steam would increase maintenance of superheaters in the absence of deposit of solids. This is due to the variations in superheat accompanying excessive moisture in the steam with a subsequent loosening of the superheater connections. This necessitates the shutting down of the boiler so that the connections may be tightened.

Turbine Losses

Impure steam often will cause deposits to form on the blades of the turbine. This causes a loss of efficiency and often even reduces the capacity of the turbine. The following extract from a letter received from the officials of a large power plant serves to illustrate very clearly the difficulty caused by this kind of blade deposit.

"The operating records show the machines (turbines) can be kept in service for only a matter of three or four weeks before the effective output of the machine drops about 20 per cent."

Even though the capacity of the turbine may not be affected materially, the average efficiency loss may be as high as 4 per cent. A loss of 4 per cent in efficiency of the turbine will reflect in large yearly losses in power production.

The deposits which form have been found to be due to impure steam and the proper treatment of the boiler water or mechanical changing of the boiler operation should prevent this difficulty. Recently, the author investigated an instance of blade deposits which formed on a high pressure (700 lb.) turbine. The average loss

in efficiency was around 3 per cent. By making changes in the boiler feed water treatment the difficulty was reduced so that the loss is now less than 1 per cent. The total cost of the new treatment is about $500 per year, whereas the saving in increased turbine efficiency has been about $20,000 per year.

Another type of turbine difficulty caused by impure steam is that due to chemical action on turbine blading. This action may be caused by oxygen, sulphur dioxide, hydrogen sulphide, etc. Recently in an industrial plant, it was found necessary to replace blades in a turbine

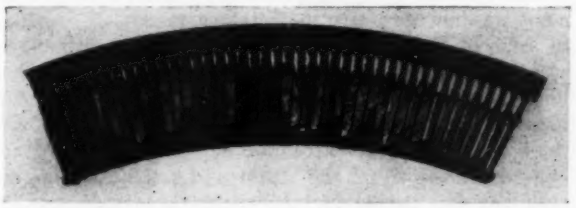


Fig. 1—Section of turbine blading showing chemical attack from impurities in the steam

after only one year of operation. The blades were found to have been eaten away badly by the action of hydrogen sulphide which was present in the steam. Figure 1 shows a portion of the blades. A very careful survey was then made of the plant to determine the source of the contamination of the steam. The sulphide was found to come from the makeup water which had been contaminated with sewage. By proper treatment, the sulphide was prevented from entering the boiler and further damage prevented. Chemical attack of the turbine may be detected readily. However, once it has started it usually proves very costly and it is best to prevent the possibility of this expensive difficulty by keeping the offending chemicals out of the steam by proper means of purification.

High Maintenance Costs for Steam and Condensate Return Lines

Impurities in the steam will increase maintenance costs for steam and condensate return lines at an alarming rate. Thus, if oxygen is present in the steam, it will cause corrosion in the steam lines. This type of corrosion is not general but causes pitting and excessive eating away of the pipe at isolated points. This in turn, causes excessive maintenance costs. It is not uncommon to encounter cases where steam pipes must be replaced after only one year of operation due to oxygen corrosion. If carbon dioxide also is present, it will accelerate the oxygen corrosion. This is due to the action of the carbon dioxide when dissolved in water to make it acidic. Thus, pure steam, when condensed, will be very close to neutral, neither alkaline nor acidic, and steam of this type will have only a slight action on steel. However, if there is present in the steam any material which would make it acid in nature, the iron is attacked. When present in an acid solution, oxygen increases the attack on the iron. If the solution is alkaline, the solution of the iron is reduced to some extent even in the presence of oxygen. In the majority of the industrial power plants, carbon dioxide is present in the steam and it is almost impossible to prevent its occurrence. However, attempts should be made to reduce the carbon dioxide in the steam to a minimum value. It is possible to eliminate the oxygen from the steam entirely, and steps should be taken in all plants to treat the boiler feed water and the boiler water so as to prevent the occurrence of oxygen in the steam.

The combined attack of oxygen and carbon dioxide often is more active in the areas where the steam has condensed. Thus, in steam traps and condensate return lines the action is very fast, and maintenance at these points often becomes excessive. In many instances, removal of the oxygen does not stop the action and it becomes necessary also to reduce the carbon dioxide content. Figure 2 illustrates the manner in which corrosion occurs in the condensate return lines of steam heating systems. These sections of unions, one new and the other having had about two years' service, show how the corrosion attacks the lower part of the pipe where the water flows and leaves the upper portion practically unaffected. In this instance, the steam contained free oxygen and a rather large amount of carbon dioxide.

Contamination of Products in Course of Manufacture

In many plants, the steam is brought into direct contact with products being manufactured, and the presence of impurities in the steam often is found to be the cause of ruining the products. Thus, in the manufacture of glazed vitreous wares, the presence of oil in the steam will cause an imperfect enamel. Often the steam contains sodium hydroxide due to excessive carry over, and the steam will be very alkaline, which in turn will change the pH value of solutions to which the steam is being added. A change of pH value in solutions

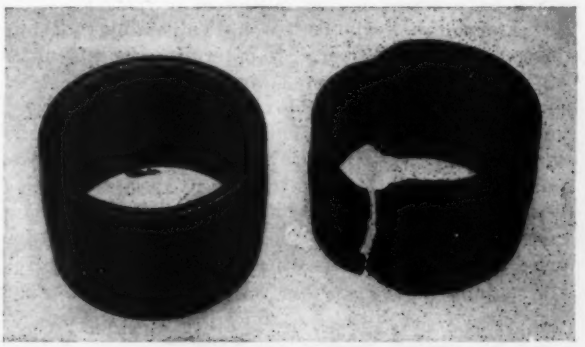


Fig. 2—Effect of corrosion on steam heating system

during the processing of many products will cause the production of an imperfect product. In the processing of lubricating oils, the presence of oxygen in the steam will prevent the production of a clear, transparent oil. If hydrogen sulphide or sulphides are present in the steam, many materials coming in contact with it will be darkened materially. The presence of ammonia or decomposed organic materials often will impart an odor to the steam or products processed with the steam, which often proves very objectionable. Corrosion in steam lines often causes the corrosion products to be carried with the steam and deposited in the material being manufactured, which results in the production of an imperfect product.

It should be realized that the steam is a potential source of contamination of products in the process of manufacture and it is more economical to keep the steam purified and prevent difficulty than it is to seek the cause of the trouble once the difficulty has occurred Continual checks should be made on the steam at frequent intervals to be certain that impurities are not present. Thus, a slight change in the water treatment, variation in the composition of the available water supplies, or change in the boiler operation might result in the presence of impurities in the steam and cause large losses in the processing of materials. For example, in one central heating plant furnishing steam to various buildings and small industrials, complaints were received regarding the objectionable odors in the steam and the contamination of products being manufactured. The power plant was receiving its makeup water from a river. During this particular time, the river was frozen over and sewage pollution was causing the trouble. During warmer weather, the polution was not encountered; consequently, a system of treatment to prevent the contamination in the winter months had to be put in operation.

Purification of Steam

Reference has been made to the removal of some of the objectionable impurities in the steam. It would be difficult even to outline the type of treatment by which all the possible impurities might be prevented from occurring in or might be removed from the steam. Even if one system of treatment could be devised to do this, it undoubtedly would prove very costly and would not be necessary in all plants. However, it would prove very economical for each plant to have a survey made of the impurities which occur in the steam or which have potential possibilities of occurring. With this information available it would be possible to isolate the cause of each impurity; to determine the difficulties which might be encountered; and to devise methods of eliminating the objectionable impurities. Such a survey would allow the management to have available figures on the cost of the difficulties traceable to the impurities and the cost of treatments to prevent these difficulties. With such actual facts and figures available, the plant executives in a large number of plants would be impressed with the savings which would be made by following the recommendations resulting from the survey.

Reducing Yearly Fuel Costs

Reginald Trautschold, M.E.
Engineering Consultant

INVESTMENTS made in plant equipment during the depression years took considerable courage, as well as business sagacity. Each dollar expended not only had to be returned promptly in the form of savings realized, but the expectancy economies also had to be of substantial character and virtually guaranteed. In short, real progress in saving money in papermaking was demanded.

This combination of drastic requirements naturally focussed attention upon approved systems, methods and equipment of well demonstrated merit, with the result that marked and noteworthy advance has been made at individual mills in many phases of power plant and mill service and operation. For instance, one prominent kraft and sulphate pulp producer in Virginia, by investing less than $3,000.00 in power plant metering devices and their accessories, has reduced fuel costs by $24,000.00 a year with an expectancy of saving well in excess of a quarter of a million dollars during the current decade.

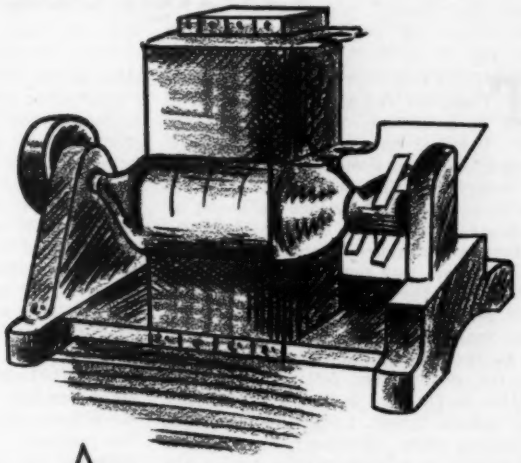
The problem of cutting fuel costs at this establishment was not seriously undertaken until 1931 and up to June of that year the best average evaporation secured with a battery of four modern, stoker fired, 600-horsepower boilers operated at 165-pound pressure, had been 8.9 pounds of steam per pound of fuel. Two of the boiler units were thereupon equipped with modern meters for recording the steam and air flows and the resulting flue gas temperature, the three basic guides for efficient boiler operation. With this vital information at hand, it was found that the best average results were to be secured when a 40 per cent excess air supply was provided for combustion. The average evaporation per pound of coal rose to 9.25 pounds of steam, an improvement of approximately 4 per cent.

As this saving in fuel was maintained over a period of six months, the remaining two boilers were provided with similar metering equipment in December and with the firing of the entire battery guided by the meter findings the average evaporation rose to, and has been maintained at, 9.6 pounds per pound of coal consumed. This improvement in steaming rate represents a reduction of about $24,000.00 a year in fuel costs, a return of 838 per cent on the $2,800.00 investment involved for the purchase and installation of four boiler meters with their accessories. Within forty-three days the entire investment was retired in fuel savings effected.

A producer of rag, vulcanizing and insulating paper in New York State, operating four 308-horsepower and one 450-horsepower boilers fired by modern underfeed stokers at 175-pound pressure, equipped the five steam generators with similar metering equipment in 1932, when conditions demanded the exercise of every possible economy, and later instigated an investigation into the money saving proclivities of the instruments. An investment of $3,500.00 had been made for the meters, etc., imposing a yearly fixed burden of $465.50 and operating expenses of about $200.00 a year. The test was made to determine whether the mill was justified in continuing these expenses—whether the use of the meters was economically justified.

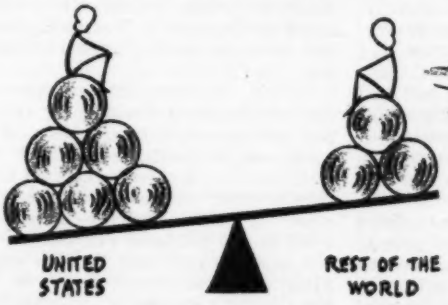
The boiler room force was instructed, consequently, to operate the boilers in the best possible manner without regard to or guidance by the steam and air flow findings of the boiler instruments. For a period of one month, the firemen were placed on their metal and permitted to use their own judgment in respect to fan and stoker feed speeds. The same firemen were then required to follow the dictates of the meter findings closely and at once a saving of approximately 10 per cent in fuel consumption was apparent. The blind operation, instead of saving money, had actually cost approximately $500.00 more a month than when the instrument findings regulated the firing of the boilers.

Paper Sketches---



AS EARLY AS 1885, A GENERATOR PLACED IN THE PAPER MILLS OF QUIMBY & CO., NIAGARA FALLS, N.Y., TRANSMITTED ITS ENERGY SUCCESSFULLY THROUGH 20 MILES OF WIRE.

THE FAMOUS SAILOR-PATTERNED COLLARS AFFECTED BY LORD BYRON DURING THE EARLY 1800'S ARE SAID TO HAVE BEEN MADE OF PAPER.



THE U. S. CONSUMES WELL OVER HALF THE ANNUAL CONSUMPTION OF PAPER BY ALL THE COUNTRIES OF THE WORLD WHICH CONSUMPTION IS ESTIMATED AT 20,500,000 SHORT TONS.

WM. BRADFORD, EARLY COLONIAL PRINTER, THROUGH ARRANGEMENT IN 1697 WITH WILLIAM AND CLAUS RITTENHOUSE, RECEIVED IN EXCHANGE FOR HIS PART IN JOINT PAPER MILL PROPERTY, A MONOPOLY OF THE MILL'S OUTPUT FOR A PERIOD OF TEN YEARS.

Twenty-fourth Annual Safety Congress Held in Louisville

THE Twenty-fourth Annual Safety Congress and Exposition was held in Louisville, Ky., October 14 to 18. Inspired through the active participation of outstanding safety leaders of America, an intensive, ceaseless drive on accidents was launched—planned on a broader scale than ever before. The attendance of approximately seven thousand people was the largest since 1930 and, from the standpoint of constructive achievement, the best in the past ten years.

At the annual meeting of members on the opening day, following the invocation by Dr. Joseph Rauch, rabbi, Temple Adath Israel, Louisville, a special message from President Franklin D. Roosevelt was read urging automobile manufacturers to do everything in their power to promote safer driving, and hinting that unless the alarming death toll is curbed, State or Federal Governments may eventually have to assume control of the public safety problem.

"It is encouraging in the face of the appalling national accident situation to know that so many of our citizens are enlisted under a single banner working to control a tragic situation," the President's message said. "May we be successful in increasing this number to millions, yes, to an accident prevention army that will include every citizen of the United States. There is a definite accident prevention work for every adult. The greatest responsibility is with the individual. It is generally the individual, and not a group, that is responsible for an accident; hence, if every one of us would recognize and assume his or her responsibility, we could reduce the accident toll of more than 100,000 fatalities in the United Stats. The major part of our safety problem would then be under control."

Another feature of the opening day session was a challenge to the American people and the National Safety Council to cut down the relentless slaughter on the highways of the nation, hurled by Governor Harold G. Hoffman, of New Jersey, in an earnest plea that the Council declare a definite objective for each state in the Union—a reduction of at least 35 per cent in motor vehicle deaths by the end of 1940. The Council expects to make a definite announcement on this proposal in the immediate future.

The menace of speed and drunken driving was emphasized strongly in the annual message of retiring President John E. Long, of Albany. He said: "Speeds on the highways are definitely higher than they were a few years ago. We must face the fact that people are no longer satisfied to travel at 35 miles an hour and many of them are impatient at 45. The modern automobile is a marvelous piece of mechanism, but no amount of engineering skill can make it any safer than its operator. While speed is involved in only a small percentage of the total number of traffic mishaps, we cannot escape the significant fact that a great many of the fatalities to occupants of cars occur at speeds in excess of 45 miles per hour."

Mr. Long emphasized the need for driver's license laws with the adequate examination provisions for all states, uniform traffic ordinances for the country as a whole and just enforcement of all reasonable regulations. He called attention to the growing importance of the problem of occupational diseases in industry and stated that industry must assume responsibility for freeing its work places from both sickness and accident hazards but that when this is done the employer has a right to be assured that he is not paying for a disability acquired elsewhere. He also urged broader studies of the psychological aspects of accident causation, stating, "We have learned much about the workings of the human mind and we have a better understanding of the whims of human behavior. We are beginning to realize that we must consider man's physical, mental and emotional sides in our efforts to preserve his life, health and happiness."

William F. Knudsen, executive vice-president of the General Motors Corporation, addressed the meeting on *Safety and Manufacturing*, in which he discussed the achievements of the automobile manufacturers in first, promoting safety within their plants, and secondly, building safety into their products. Mr. Knudsen urged a more intensified and educational program for the driver; strong driver's license laws; and the compulsory inspection of automobiles "to determine the mechanical condition of brakes, lights, warning signals, steering gear, windshield wiper, and the leakage of exhaust gases."

The annual meeting of members closed with the unveiling of 120 bronze plaques and 74 framed certificates to be awarded winners and "runners-up" in seven major contests conducted by the National Safety Council. One hundred four of the plaques and 46 of the certificates were awarded in the six industrial contests conducted by the Marine, Metals, Paper and Pulp, Petroleum, Rubber and Public Utilities sections. In these contests, 775 industrial units, employing 780,000 workers, and working a total of 1,187,087,000 man-hours, competed.

Dr. C. H. Watson, medical director of the American Telephone and Telegraph Co., New York City, was unanimously chosen president of the National Safety Council for the ensuing year and the announcement of his election, together with the list of officers and executive committee was made at the Annual Banquet on Wednesday evening.

MEETINGS OF THE PAPER AND PULP SECTION

A finely developed program of subjects and speakers had been prepared for the Paper and Pulp Section. The meetings were held in the Brown Hotel and lasted from Monday to Thursday, or four half-day sessions, an evening supper smoker and the annual luncheon. The attendance was representative of many mills and one of the largest in recent years.

The untimely passing on August 9 of General Chairman Herbert D. Banta spread a mantle of sorrow over the opening proceedings as Vice-Chairman Earl E. Grant expressed warm and deserved praise for the late Mr. Banta's untiring services in the safety movement and to the Paper and Pulp Section in particular. A committee on resolution consisting of F. H. Rosebush, Ernest Augustus and Walter A. Gleason, secured the unanimous expression of the Section's sense of personal loss in Mr. Banta's death, the text of which is in an adjoining page.

Accident Experience Exchange

Following reports of the various committees, all of which showed marked progress in the year past and an increase in membership, the first subject on the program was a *Report of Accident Experience Exchange* by A. E. Winslow, personnel director of Hollingsworth & Whitney Co., Waterville, Maine, and chairman of the Statistics Committee.

During the year 239 lost-time accidents had been submitted for this report which was a continuation of the work started last year. There were 1,448 lost-time accidents reported in the 1934-35 Safety Contest. Last year there were 300 in the Exchange Report and 1,405 in the National Contest. It was felt unwise to attempt to draw conclusions from inductions based on data from so few a number of accidents. However, should the present routine continue for a few years, an accumulated statement at that time might be of unquestionable value.

Out of 111 plants reporting 1,448 accidents in the Safety Contest, only thirty-six reported to the Statistics Chairman. Of these thirty-six plants, eighteen were operated by three companies and of the total 239 reports made, 138, or fifty-eight per cent, came from the plants of these three companies. Hope was expressed that the benefits of

RESOLUTION passed by the Paper and Pulp Section of the National Safety Council of Chicago on the death of

HERBERT D. BANTA

In recognition of the long and untiring services of Mr. Herbert D. Banta in the field of safety education, the Paper and Pulp Section of the National Safety Council at its annual meeting held at Louisville, Kentucky, October 15, 1935, wishes to express its sense of personal loss in the death of Mr. Banta, and its appreciation of his services as a member and officer of the Paper and Pulp Section.

For many years Mr. Banta has been a tireless worker in behalf of the safety movement in preventing accidents and injury to employees in industry, and the National Safety Council, particularly the Paper and Pulp Section, has suffered a distinct loss in Mr. Banta's death.

Be it, therefore, resolved that this expression of appreciation be sent to the family of Mr. Banta, and to Mr. J. M. Conway, President of the Hoberg Paper and Fibre Company, with whom he was associated; also that it be spread upon the minutes of this meeting.

(Signed) F. H. Rosebush.
Ernest Augustus.
Walter A. Gleason.

these studies might arouse a greater participation in the future.

Of the thirty-six plants reporting for this study, the number of accidents per plant ranged from one to twenty-three, which is a decided improvement over last year's range of one to sixty-nine for forty-six plants, or a reduction of sixty-six per cent for the mill having the greatest number of accidents. The average time lost per individual including charges for all types of disabilities was 100.2 days against 108.9 days last year, or a reduction of 7.99 per cent. Included in this year's study are two fatalities, ten finger amputations, and one lost eye. This compares with four fatalities, seven finger amputations and loss of one eye last year. Attention was called to the necessity of answering all questions on the report form regardless of personal feelings or beliefs as to their value.

Tables showing comparisons of the experiences of 1934 and 1935 were presented. In two years' reports there is practically an exact similarity regarding times of the greatest accident hazard; namely, between nine and twelve o'clock in the morning and two and four in the afternoon. Two years' tabulations show that ages twenty-five to thirty produce the maximum of injuries. It was also brought out that 31.38 per cent of all 1935 accidents occurred among employees who had been in the company service less than two years, which indicated a tendency for those younger in term of service to become injured.

With reference to the distribution of accidents by departments, it is interesting to note that machines continue to claim the greater part—101 different machines were involved in the 239 accidents reported.

Thirty per cent of the injuries sustained were fractures and amputations and twenty-six per cent were bruises, contusions and abrasions. Lacerations and cuts came third in the list and sprains and strains fourth. It was pointed out that if and when this data is accumulated to a thousand or more accidents, it will be a simple matter to show some of the relationships of departments to the nature of injuries. Hands, fingers, feet and toes were the parts of the body most frequently injured, with the eyes, back and spine, arm, knee and lower leg coming in the order named.

The types of accidents or the causes of injury are shown in the accompanying table. Of the 43 cases listed under "Miscellaneous" with 11,970 days lost, two alone account for 10,500 days and two others 354 days, all standard time charges, leaving 39 cases accounting for 1,121 days.

In conclusion, Mr. Winslow said that while it was realized the report fell short of being complete, it was believed the data could be used in making studies of individual mill experiences, and the plea was made for a more general and complete participation on the part of mill members of the Section, and that just so far as this is done the Statistics Committee Chairman will have something of real value to report.

Election of Officers

The following officers were elected for the ensuing year:

General Chairman—E. E. Grant, The Crystal Tissue Co., Middletown, Ohio.

Vice-Chairman in Charge of Membership—F. L. Irvin, St. Croix Paper Co., Woodland, Maine.

Secretary and Program Committee Chairman—George J. Adams, International Paper Co., New York, N. Y.

News Letter Editor—(Yet to be selected.)

Engineering Committee Chairman—J. H. Turner, Consolidated Paper Corp., Ltd., Grand 'Mere, P. Q., Canada.

Statistics Committee Chairman—A. E. Winslow, Hollingsworth & Whitney Co., Waterville, Maine.

Poster Committee Chairman—Clayton Braatz, Marathon Paper Mills, Rothschild, Wis.

Contest Committee Chairman—A.Scott Dowd, THE PAPER INDUSTRY, Chicago, Ill.

Analyzation of 539 Accidents in Paper and Pulp Mills Reported in Accident Experience Exchange

	1935		*1934*	
Types of Accidents or Causes of Injury	*No. Cases*	*Days Lost*	*No. Cases*	*Days Lost*
Falling or slipping material and objects	51	7,168*	66	7,375*
Falls (from heights or level)	31	1,033	47	1,268
Hand tools	1	Not Given	28	377
Lifting, pulling, pushing, prying	7	134	27	199
Caught in revolving rolls	16	1,240*	24	6,932*
Handling material and objects	20	384	19	410
Caught in gears, belts, etc	5	133	19	7,501
Caught under or run over by	2	51	10	52
Struck by flying objects	6	728*	10	85
Caught or jammed between objects or material	19	645*	7	72
Splashing liquids	0	0	6	38
Stepping in holes or on objects	8	61	6	42
Striking and bumping against things	7	105	4	77
Burns and Scalds	15	184	7	7,914*
Hot water and liquids	6	119	3	1,854
Hot pipes and materials	5	29	1	54
Contact with flames	1	3	0	0
Electric, live wires	2	13	2	6,003*
Acid, caustics, chemicals	1	20	1	3
Explosion, explosive action	4	46	6	83
Foreign bodies in eyes	2	42	2	7
Clothing caught in machinery	2	319	2	65
Miscellaneous	43	11,970*	10	187
Total	239	24,243	300	32,674

(*) Indicates standard time charges are included.

Health Committee Chairman—Dr. E. W. Paine, Hollingsworth & Whitney Co., Waterville, Maine.

Members at Large—Ernest Augustus, Mead Paper Corp., Chillicothe, Ohio; W. J. Brennan, Maine Dept. of Labor and Industry, Augusta, Maine; D. B. Chant, Ontario Pulp & Paper Maker's Safety Assn., Toronto, Ont., Canada; T. L. Christensen, Continental Paper & Bag Corp., Marinette, Wis.; Kenneth L. Faist, Champion Paper & Fibre Company, Hamilton, Ohio; W. A. Gleason, Hammermill Paper Co., Erie, Pa.; J. J. Hastings, Port Huron Sulphite & Paper Co., Port Huron, Mich.; Don E. McDowell, Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.; Arthur Murray, Container Corporation of America, Chicago, Ill.; W. J. Peacock, Northern Paper Mills, Green Bay, Wis.; J. J. Pizak, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.; Samuel Pruyn, Finch-Pruyn and Co., Inc., Glens Falls, N. Y.; F. A. Robinson, Kimberly-Clark Corp., Neenah, Wis.; B. D. Rogers, Bird & Son, Inc., East Walpole, Mass.; and F. H. Rosebush, Nekoosa-Edwards Paper Co., Port Edwards, Wis.

Tribute was paid by General Chairman E. E. Grant to the splendid service of the News Letter Editor in the past year. In performing this task, T. L. Christensen, of the Continental Paper & Bag Corp., Marinette, Wis., did an outstanding job. Many helpful suggestions were made by him in the October issue of the *News Letter*, and it was regretted that he could not continue the work for another year.

SECOND DAY'S SESSIONS

The program of the second day began with a paper by D. B. Chant, secretary-engineer, Ontario Pulp & Paper Makers' Safety Association, Toronto, Canada, on *Accident Prevention in the Paper and Pulp Industry in Ontario.*

Before going into the subject of his organization and its functioning, Mr. Chant referred to the Workmen's Compensation Act of Ontario, which he considered one of the soundest and best pieces of legislation of its kind to be found anywhere.

The Act became a law in 1915 to provide recompense for accidents to workmen in their employment, to get rid of litigation, and to secure promptness and certainty of payment to the workman or his dependents without unduly burdening the employer. It extends its protection of the workman to all accidents arising out of and in the course of his employment instead of merely those caused by the negligence of the employer, as was the case prior to 1915, and it places the adjudication of claims in the hands of the Compensation Board set up by the Act, instead of the courts.

Under this Act, all industries except a few are covered under one of two schedules. Under Schedule 1, which includes the paper industry, the collective liability is applied to groups of employers. There are twenty-four classes, each in turn being separated into a number of rate groups. The paper industry enjoys an exclusive grouping as Class two which is rated by groups as follows: pulp mills and board mills; combined pulp and paper mills; converting paper mills; corrugated paper box makers; miscellaneous converting and allied plants; pulpwood logging operations—restricted to bona-fide logging of pulp or paper companies on their own lands.

Each employer is required to pay into the class accident fund each year an assessment based upon his total payroll, and all cost of accidents occurring in the industry, including both compensation and medical aid expense, is defrayed by the board from this "Class" fund. Permanent disability pensions, or pensions to widow or other dependents of injured workmen, are capitalized promptly, and the required sum transferred out of the accident fund into a pension fund which is kept invested and earning interest. Administrative expense is spread on a pro rata basis as a total assessment paid each year, and there are other minor provisions. The collective liability feature of the Act is the basis for the scheme of organization.

Since the whole cost of each accident in the industry comes out of the class accident fund to which all in the class contribute assessments, it naturally follows, in theory at least, that an accident happening anywhere in the plants or woods operations is a matter of concern to everybody because it must inevitably be reflected in the rates of assessment applying to all in the class. Conversely, a good accident experience anywhere benefits everybody in the industry. This commonality of interest is the keynote of the accident prevention organization, which was incorporated in 1915 and is known as the Ontario Pulp and Paper Makers' Safety Association.

Under the authority of the Act, the Compensation Board may approve such rules and regulations as the Association may adopt and when so approved they become binding upon all employers coming under that particular class. Every employer whose business is from time to time assessed under Class Two, becomes automatically a member firm of the Association and remains a member so long as his business remains in Class Two. Fees or dues are collected by the Board as a part of the payroll assessments and thus are truly proportionate to the payrolls of the various members, and the funds so collected are paid over to the Association by the Board which exercises reasonable control of its expenditures and audits the accounts annually.

The association is governed by a board of directors consisting of sixteen men elected at an annual general meeting of members, and they are almost invariably senior executives of member firms. They meet each month and really direct the affairs of the Association.

The charter of the Association defines its aims and purposes as being "To promote and carry on the work of prevention of accidents in pulp and paper mills and in any other industries which may for the time being and from time to time be assessable by the Workmen's Compensation Board in the same insurance group as pulp and paper mills, and generally to represent employers and employes engaged in such industries in connection with the administration of the Workmen's Compensation Act." This is interpreted to entitle the Association to concern itself not only with safety but also with reducing cost of accidents, without, of course, in any way abandoning its neutral position as representing both the employing group and the employed.

While accident cost reduction is considered one of the Association's major purposes, "compensation chiseling" is not included among the reasonable and proper means to that end. Every injured workman receives full justice within the provisions of the Act, but in the best interests of all, no toleration of abuse by grafters and maligners is permitted, and the Association does its best to uncover fraudulent claims, correct abuses, and bring an end to unfair practices by whomsoever committed.

The Association's service to member firms and their employes includes the following:

1. Collecting, recording, and tabulating of accident data covering every member firm's experience and each accident involving any expenditure of money from the class accident fund.

2. Distribution to all member firms, at regular intervals, of comparative statistical information on accident frequency, severity and cost so that each can see how its own experience compares with that of the class as a whole and the particular rate-group in which it is placed for assessment purposes.

3. Making periodical inspections of plans for the purpose of aiding in the recognition and removal of physical and mechanical hazards.

4. Assisting to organize and carry on accident prevention work in plants and woods operations.

5. Advising, and aiding in every reasonable way, the managements of member firms to reduce their accident costs and thus to save money through lower assessment rates.

6. Participating in safety rallies and meetings of employes, where desired, to assist the management to stimulate interest in accident prevention.

7. Conducting annual competition among member firms in accident prevention to arouse and maintain interest.

8. Encouraging the training of as many as possible of the workers in the industry in first aid and awarding trophies and prizes.

9. Investigation of the circumstances of serious or fatal accidents and circulating of information thereon among members so that similar occurrences may be avoided in the future.

10. Advising and assisting in all matters having to do with assessment rates or compensation matters in general.

11. Arranging of meetings of geographical groups of plants and woods operations from time to time for the discussion of matters of all kinds affecting

accident frequency, severity, or cost, and to encourage the various firms to improve their safety programs.

12. Acting as a clearing house for information having any sort of bearing on accident prevention or cost reduction and rendering any other service in line with our aims and objects and the interests of member firms and their employes.

Keeping track of the accidents which have occurred and tabulating their nature, cause, degree of seriousness, and cost for compensation and treatment does not in itself prevent other accidents from happening. The issuance of reports and bulletins showing accident experience must come after the fact of the accidents. Accident cost statements can only show the amount already spent. But it has been found that such data in the hands of the managers of member firms does stimulate interest in the prevention of future accidents.

During the past couple of years, the Association has been trying to find out more about the causes of accidents. This study is teaching that the mechanical hazard is not nearly so important as has been believed. In the years 1933 and 1934 in Ontario mills, only 7.3 per cent of their accidents and 12.4 per cent of their cost arose from what is called faulty mechanical conditions; while 51.2 per cent of the cases and 52.4 per cent of the total cost were due to human hazards, such as inattention, lack of care, horse-play, errors of judgment, unsafe clothing and acts of fellow workmen. The physical or mental condition of the victim was held responsible for 4.8 per cent.

In woods operations, mechanical causes play even a smaller part in accidents. The chief hazard is the man with the axe who, to judge by results in recent years, is not as cunning and dexterous with this weapon as he was formerly. Axe cuts made up 29 per cent of the injuries last year, and 37.7 per cent of all cases were classified as involving hand tools; 31.7 per cent covered injuries caused by falling trees, rolling or sliding logs, spilled or upset loads, and strains due to carrying, dragging, or lifting logs; uneven footing produced 12.3 per cent of all cases, while frostbite produced 3 per cent of the disabling injuries; cases involving equipment other than hand tools represented only 5.5 per cent, while infection of minor abrasions and scratches made up another 3.3 per cent. Accident frequency in the woods is approximately 4½ times what it is in the mills, and woods accident costs are three times the mill cost, hence woods operations are considered as the major accident problem.

Cost figures covering accidents in mills over a period of eleven years—1923 to 1933, show steady improvement. The average assessment rate for all plants was $1.58 per $100 of payroll assessable, while the cost of all accidents came to $1.45 made up as follows: compensation to the injured worker or his dependents, $1.15, and cost of treating the injuries, 30 cents. Distribution of the surplus was exhibited. Decreases in assessment rates in 1934 from those in effect the previous year spelled a net saving of about $23,000 in total assessment for member firms, and it is expected the 1935 rates will carry this saving forward for another year. There should be no difficulty in justifying their existence as an Association for accident prevention, so long as the monetary savings year by year are larger than the budget.

Safeguarding Paper Mill Machinery

"In the viewpoint of the purchaser," said M. W. Dunmore, production manager of the Beloit Iron Works, Beloit, Wis., speaking on the subject of *Guarding Paper Mill Machinery*, "There are certain factors which are the responsibility of the builder. Exposed and moving parts should be adequately guarded. Guarding should be built into and made an integral part of, rather than a flimsy contribution to the machine wherever possible and practicable. Accessibility nevertheless should be paramount.

"The final responsibility, however, is in all cases that of the user," he said, "because fundamentally sound and safely built equipment may during installation, alteration and operation become unsafe unless the user exercises continuous supervision over the equipment."

In discussing the various factors of safety which builders recognize as their responsibility to the industry, Mr. Dundore said that engineers are keenly alive and during the past ten years have taken rapid strides toward helping the user prevent accidents by designing the equipment proof against personnel lapses and free from structural flaws.

To safeguard the operators of paper machines, thought has been given principally to shock absorption, friction between rotating elements, corrosion resistance, steam, oil, water, air and power transmission control, dynamic and static balance, acoustics involving high speed noises, vacuums, moving and revolving masses, weight, lubrication and a host of other variables.

A lengthy list of safety specifications for the paper machine was given beginning with the wet end of the fourdrinier and cylinder machines and continuing on through the drives and motor control.

On a paper machine, conditions are extremely favorable for generation of static electricity through frictional forces and pressure acting on the paper as it passes over the dryers and through the calender stacks. This accumulation is sufficient to produce charges of high voltage, and it is a common occurrence to obtain sparks from the paper when being reeled unless precautions are taken to discharge it by grounding the sheet or calenders through chain or pipe.

There should be plenty of room between machines and the walls for the operators and auxiliary equipment. Walks across the tops of machines should be safe places and securely fastened. Lighting should conform to the very latest and most enlightened practices. Extension cords should be waterproof so as to eliminate danger of wet floor and shocked workmen. Maintenance needs should be anticipated far enough in advance so that proper planning can be exercised. If water or air hose must lie on the floor, the operators should be instructed to keep it coiled, for it not only looks neater but guards against tripping. Dangling chain blocks and chain, rope sheaves and rope are not good practice when left suspended and not in use.

Builders of paper machines have reached the conclusion that the less handling required, the lesser is the number of shutdowns; the more the operator has to remain away from the moving machine, the lesser is the accident frequency and severity of the injury.

Supper Smoker and Entertainment

An innovation was made in the program of the Section's annual meeting this year by introducing a form of entertainment in the character of a supper smoker. It took place at the Brown Hotel at six-thirty p. m. of the second day with J. J. Pizak, past general chairman acting Master of Ceremonies. The opportunity afforded to relax from the tension of the business sessions and to enjoy the goodfellowship that exists among the members of the Section, proved very successful. Some clever performers and the customary circle of "Adeline" singers around the piano on which the nimble fingers of home talent led the strains, gave plenty of fun and pleasure.

THIRD DAY'S SESSIONS

The meeting of the third session on Wednesday morning was opened with a talk by W. J. Peacock, head of the department of personnel, Northern Paper Mills, Green Bay, Wis., who discussed the topic *Massing Man-Power Back of Safety*.

He emphasized the timeliness of the theme by noting that various traffic courts are now on the air: "Uncle Bob" features the children in his broadcasts; school boys work into safety early as members of boy patrols, while cities like St. Louis draft leading citizens as traffic "vigilantes."

The Northern Paper Mills, thanks to the aggressive leadership of Mill Manager Frank J. Timmerman, has worked up in one year what Mr. Peacock described as the most interesting organization of man-power he had ever witnessed. He showed how effective the new program had been in meeting the "tough assignments" of Wisconsin Industrial Commission rules. Workmen have come forward with suggestions arrived at in the daily training of their own tasks. Safety committees in regular sessions and especially after accident inspections have applied themselves to the problems most serious in accidents, namely: What undoubted and clear cause lies behind the case in hand? and How can this accident be made the last of its kind?

Ninety employees serve on five departmental committees, and one general committee at The Northern. Mr. Timmerman is the recognized leader; Mr. Peacock

serving as secretary. The departmental committees meet once a month with their superintendent, in his office. The general committee meets with Mr. Timmerman, or, at his option, alone. This committee is responsible for a personal, uninfluenced investigation of every accident, and, while an investigation is also made by the department men, the decisions of the general committee "start from the ground and favor nothing but the facts."

Mr. Peacock gave two illustrations of the striking earnestness of these investigations. The committee, in one accident, was required to cover an accident to a brother-in-law of a high plant official. The other case had to do with a favorite member of the committee in person. The first man was found negligent, having broken a clear-cut rule of his department; the other man, their own "buddy," became the object lesson around whom a new safe-practice rule was suggested, and the committee added: "It is bad practice to wear gloves while placing rollers under seven-ton loads!"

The question whether an injured man's name should be posted following an accident was decided by the workmen's committee in the affirmative, on the ground that while the injured man undergoes suffering the whole plant goes through an experience. "This is our accident as well as the man's."

The rules that grow out of accidents, "written in blood," said the speaker, are strikingly efficient, having much the weight of test cases in law. The way these employee representatives get after the man who neglects his goggles, or show up such ancient habits as "feeling the rolls," or raise the question as to a safe height for a yard-load of pulp wood, or puzzle over the human-interest situation of the man growing too old for mill hazards is a revelation of the influence of an intelligent program upon mill mind.

"You will not be surprised," said Mr. Peacock, "when I tell you that the employees of our plant have had much experience in managing their own credit union. They dominate the affairs of their own Welfare and Insurance club. A background of experience on safety committees also provided the man-power now used so effectively for plant safety."

Psychology of Safety from Management's Viewpoint

In introducing the next speaker on the program, the chairman reminded the group of his prominence in support of the safety movement, not only in his own mill and state, but throughout the entire industry where a wide acquaintance of him has been spread through his articles in the press and his participation in former programs. J. M. Conway, president of the Hoberg Paper & Fibre Co., Green Bay, Wis., is an example of that type of management that is requisite for the success of the accident prevention program in industry.

Mr. Conway said that accident prevention in industry can be treated or considered under three distinct heads: (1) "Mechanical Safety," or the development and application of safeguards; (2) "Physical Safety," or the development of personnel; and (3) "Mental Safety," or the development of a state of mind in management and personnel which promoted the safety idea until it became firmly fixed in both the conscious and subconscious minds of every individual employed in the industry.

The last classification he believed the most important, and that the degree of appreciation of its importance measures the degree of success attained in the safety movement to date.

Mr. Conway continued in part: For many years we have been placing safety appliances in our plants and have been hiring men and women who were physically fit and adaptable to the tasks assigned. But, it was not until we were successful in fixing in the minds of every individual in our industries the value of a correct mental attitude, that our accident lists appreciably decreased.

The movement of accident prevention has risen from an almost hopeless theme of a group of idealists, to a place where it has many friends. Unlike many other great American movements, it has found favor with both sides of every faction and every group.

Study the accident records of today and you will find that most of them are more involved than were those of the past. Prevention of these accidents is going to require far more than application of safeguards and a list of "don'ts." It is going to require concentrated thought on the part of executives and new zeal on the part of plant foremen.

Every employee must be taught to think in terms of accident prevention. He must be taught that there is only one way to accomplish a task, and that is the "safe way." No mere order from the executive is going to do the work. Success will come through leadership and unabated effort.

To lead, the executive must have developed a "Safety Psychology." He must think and act in terms of safety. He must plan his year's industrial campaign with safety as a distinct part of that campaign. He must then transmit this "Safety Psychology" to his foremen, and they in turn must give it to the men and women under them. If the entire plant organization, from executive to janitor, thinks in terms of safety, then we will have it.

An executive without "Profit Psychology" would be an executive more or less foreordained to failure. I contend that "Safety Psychology" is not only as important as is "Profit Psychology," but that it is one and the same thing and that the plant with accidents cut to a minimum has a greater opportunity to profit than has one in which the accident hazard is large. A safe plant is usually an efficient plant—and an efficient plant is usually a profitable one.

The keen executive has appreciated this fact, and to a large degree it has brought about concentration upon means to eliminate accidents. Thus we must mark "Safety Psychology" as one of the attributes of a real executive and stockholders and directors of every enterprise should demand that the man who directs their industry have it in a pronounced degree.

The automobile of today is causing more death and injury than could have been laid at the door of industry at any time in its history. Has industry any responsibility in this situation, that is daily growing more serious? I believe that it has. In fact, I believe that traffic slaughter can be reduced only if industry and other agencies adopt this responsibility and handle it just as accident prevention has been handled by the industrialist and his employees.

Much has been said of late about wealth, its taxation and its redistribution. All talk along this line has referred to money and property, but the real wealth of America cannot be redistributed because it has been conferred upon men and women by their Creator in the form of bodies and minds that function in the degree that the Creator meant them to function. We cannot redistribute mental capacity or physical perfection. The individual either has it or it is missing upon his arrival with us.

We can, however, give each individual an opportunity to live under healthful conditions and to develop the mental capacity given him by the Creator. These are our obligations as citizens and we are meeting them. As men and women in industry we have the added duty of safeguarding the bodies and mentalities of our fellow workers against accident, and I am proud to say that we are performing this duty well.

If we are failing in any way, it is because we have not as yet found all of the tools required for a perfect job. We have safeguarded our plants to the Nth degree. We have used our best intelligence in selecting the best man or woman for the tasks to be done, and we have developed "Safety Psychology" to a point where plant officials and employees look upon an accident as a direct reflection upon themselves.

But, I am sure all of us can go much further in developing "Mental Safety"; in fact, if we are to go farther in accident prevention, we must do so.

In closing let me pay tribute to the paper mill industry for its wonderful record along the line of accident prevention. In my observation no other group of men in industry has done more to set up real safety organizations, nor is there any industry where managers and employees are more harmoniously organized in promoting accident prevention.

The Paper and Pulp Luncheon

The usual interest in the results of the 1934-35 Safety Contest was exhibited in a large attendance at the Annual Luncheon, where trophies and awards were given to the successful mill and plant contestants. Copies of the Final Report and Ranking in the Contest as of June 30, 1935 were distributed, and A. Scott Dowd, of THE PAPER INDUSTRY and chairman of the Contest Committee, presented the following data:

FINAL REPORT—THE PAPER INDUSTRY ANNUAL SAFETY CONTEST OF MEMBERS, PAPER AND PULP SECTION, NATIONAL SAFETY COUNCIL

July 1, 1934, to June 30, 1935

Year	No. of Mills	Man-Hours Worked	Employees	Number of Disabling Injuries	Days Lost	Rate		Mills with Freq. below Aver.	Mills with Sev. below Aver.	Ratio		Days Lost per Injury	Mills with Perfect Records
						Aver. Freq.	Aver. Sev.			Empl. to Acc.	Non-Fatals to Fatals		
*1934-1935	110	86,867,184	42,378	1,439	.....	16.566	.....	63	.....	29 to 1	.....	.....	12
1933-1934	105	71,436,322	34,132	1,402	102,099	19.626	1.429	56	80	24 to 1	141 to 1	73	6
1932-1933	98	60,772,518	34,709	829	101,169	13.641	1.665	53	71	42 to 1	83 to 1	122	11
1931-1932	131	74,569,954	32,454	1,044	40,211	14.000	.539	55	69	33 to 1	60 to 1	39	9
†1931	125	48,715,543	39,796	787	17,263	15.744	.354	72	76	52 to 1	192 to 1	23	15
†1930	124	47,343,549	36,153	986	22,504	20.826	.475	55	66	37 to 1	163 to 1	23	11
†1929	123	49,776,515	36,916	1,311	25,073	26.337	.504	59	80	27 to 1	187 to 1	19	6
†1928	122	47,673,816	36,357	1,355	26,368	28.422	.553	64	76	27 to 1	150 to 1	19	8
†1927	119	43,802,804	33,786	1,468	28,396	33.514	.649	61	75	23 to 1	147 to 1	19	6

*This contest based on frequency only.

†Contest period January 1 to June 30.

Note: In all contests prior to 1932-33, the Standard Scale of Time Charges was not used for deaths, permanent total disabilities and permanent partial disabilities. Only one-sixth (1/6) of the scale charge for specific injuries was used. On July 1, 1932, the Standard Scale was adopted. This explains why the 1932-33 and 1933-34 severity rate is considerably higher than for other years.

DATA ON THE 1934-1935 SAFETY CONTEST

The record and final report of your 1934-1935 Safety Contest has been placed in your hands. As a whole the results are worthy of praise. 42,378 employees with an exposure of 86,967,184 man-hours is the greatest number that have ever been engaged in this section's safety contests of pioneer record.

110 units that completed the contest is an increase over the number of participants in the previous year and is the greatest number of mill contestants since the banner year of 1931-1932.

To simplify the contest and set up the one great objective—Reduction of Accidents, Frequency has been made the sole governing factor in this contest of our section, as it is now the standard of all sectional contests in the National Safety Council.

It is a rejoicing fact that the average frequency rate in this contest has been reduced more than three whole points over that of the previous year, and there are four additional perfect scores or a total of ten. (Note there is an error in the report summary which includes two perfect scores of mills that did not qualify under the minimum requirement of our rules.) The average frequency rate for the past nine contests is 20, which is the lowest over-all frequency average that has been thus far attained.

Comparing the records of each group in the 1934-1935 Contest with those attained in the previous year, we find that considerable progress has been made.

While Group A has not had a perfect score since the six-months contest of 1929, there were eight more contestants in this group than last year, and the average frequency rate of 14.969 was a reduction of 27½ per cent. This was the greatest improvement over the previous year made by any other group in this contest.

Group B contained four more contestants than in the year previous, and its average frequency rate of 17.294 was an improvement of 7½ per cent. One perfect score in this group marks the third consecutive time that the St. Croix Paper Company has made this record.

Group C ran practically the same record as the year before, with one additional contestant and a slight reduction in frequency to the average rate of 22.226. There were no perfect scores in this group, which is the second consecutive year that this has happened. Previous to the 1933-34 contest, this group recorded two or more perfect scores each year.

Group D had five more contestants than were in the previous year, and a slight improvement of one per cent in frequency was made for an average rate of 19.935. Five perfect scores distinguished this group, or an increase of two over the number recorded in the 1933-34 contest. The outstanding achievement in this group is the record of the Riley mill of the International Paper Company which has been operating without a lost-time accident since March 17, 1926, or an unbroken record of over 1¼ million man-hours. The Re-Manufacturing Group, Division Two, recorded four perfect scores, or an increase of two over the year before. A reduction in frequency of 21 per cent was made for an average rate of 11.477.

A comparison of *Division One* as a whole in 1934-35 with the year before is as follows:

1933-34 Contest..Frequency 20.041
1934-35 Contest..Frequency 16.903

Approximate reduction .....15½ per cent

Division Two is as follows:

1933-34 Contest..Frequency 14.573
1934-35 Contest..Frequency 11.477

Approximate reduction .....21 per cent

In the present contest, 1935-1936, all rules of the former contest have been retained with one revision of Rule 3, which now contains the clause, "All operations outside the mill yard proper, such as logging, lumbering, reforestation, marine and railroad transportation SHALL BE EXCLUDED."

There are 124 mill units entered in the 1935-36 Contest, and for the first two months, 53 mills maintained perfect records.

National Safety Council Trophies Awarded

At the annual Luncheon in 1934, C. B. Auel, manager of the Employees' Service Department, Westinghouse Electric and Manufacturing Co., East Pittsburgh, and past president of the National Safety Council, was generous in his praise of the Paper and Pulp Section for its record as a pioneer in safety contests among industrial plants. He made the suggestion at that time that the Council might consider some suitable expression of recognition for those companies which started in the first contest in 1925 and have participated in all that have followed. The Council accepted the idea and Mr. Auel was again asked to make the presentations this year, which included Certificates of Appreciation presented on behalf of the Executive Committee of the National Safety Council to the following six companies in recognition of their continuous participation in these contests, thereby demonstrating their loyal interest in the organized movement to conserve human life and limb: Kimberly-Clark Corporation, Neenah, Wis.; Marinette & Menominee Paper Co., Marinette, Wis.; Bemis Brothers Bag Company, Peoria, Ill.; Nekoosa-Edwards Paper Co., Port Edwards, Wis.; Strathmore Paper Co., Mitteneague, Mass.; Mead Corporation, Chillicothe, Ohio.

Mr. Auel then awarded bronze plaques

to the mills ranking No. 1 in each group, and certificates to the mills ranking second and third, providing there were not more than two or three perfect scores in a group. Following is the list of mills that received Group awards:

DIVISION I

Group A

Rank 1 (Trophy)—Hollingsworth & Whitney Co. (Algonquin & Taconnet), Waterville, Maine.

Rank 2 (Certificate) — Bryant Paper Co., Kalamazoo, Michigan.

Rank 3 (Certificate) — Canadian International Paper Co., Three Rivers, Quebec.

Group B

Rank 1 Perfect Score (Trophy)—St. Croix Paper Co., Woodland, Maine.

Rank 2 (Certificate)—Kimberly-Clark Corporation, Niagara, Wis.

Rank 3 (Certificate) — Fraser Company, Ltd., Edmunston, N. B., Canada.

Group C

Rank 1 (Trophy)—International Paper Co., No. Tonowanda, N. Y.

Rank 2 (Certificate) — The Crystal Tissue Co., Middletown, Ohio.

Rank 3 (Certificate) — Escanaba Paper Co., Escanaba, Michigan.

Group D

Rank 1 Perfect Score (Trophy)—Bird & Son, Inc., Phillipsdale, R. I.

Rank 1 Perfect Score (Trophy)—United States Envelope Co. (Morgan Paper Div.) Lititz, Pa.

Rank 1 Perfect Score (Trophy)—International Paper Co. (Livermore Mill), Chisholm, Maine.

Rank 1 Perfect Score (Trophy)—Spaulding Fibre Co. (New Mill Plant), Milton, N. H.

Rank 1 Perfect Score (Trophy)—International Paper Co. (Riley Mill), Riley, Maine.

DIVISION II
(REMANUFACTURING GROUP)

Rank 1 Perfect Score (Trophy)—Container Corporation of America, Natick, Mass.

Rank 1 Perfect Score (Trophy)—Texas Corrugated Box Co., Dallas, Texas.

Rank 1 Perfect Score (Trophy)—Southern Container Co., Houston, Texas.

Rank 1 Perfect Score (Trophy)—United States Gypsum Co., Genoa, Ohio.

The Paper Industry Trophy

On behalf of Edward B. Fritz, publisher of THE PAPER INDUSTRY, Chicago, who was unable to be present, Mr. Dowd awarded Mr. Fritz's major trophy to the mill which the judges decided had made the most outstanding record of the Contest, being the St. Croix Paper Company, Woodland, Maine. This made the third consecutive time that St. Croix had taken the major prize, and it chalked up the best continuous record thus far attained. This record performance began September 22, 1931, and up to the close of the Contest on June 30th, had totalled 2,991,418 consecutive safe man-hours. A rising vote attested the unanimous expression of admiration for this achievement which was put in the form of a resolution and sent to the management and operating workmen of the St. Croix Paper Company.

The trophy was accepted by Walter J. Brennan, of the Maine Department of Labor and Industry, Augusta, Maine, who with warm words of praise for both donor and recipient agreed to bear it to the St. Croix mill.

FOURTH DAY'S SESSIONS

The final session on Thursday morning was introduced with an exceptionally interesting talk on *Paper Mill Maintenance and Repair* by Clyde Ferrell, superintendent of maintenance, The Mead Corporation, Chillicothe, Ohio.

"Maintenance men," said Mr. Ferrell, "compose one of the hardest groups to handle in the paper mill. They must constantly transport tools from shop to job, and from job back to shop. There is also a great variation in jobs; a mechanic may work three or four weeks, each day on a different job."

In most modern companies Mr. Farrell said the plan is to budget department heads with so much money for maintaining the mill and equipment. The budget depends not only on maintenance men to keep costs reasonable but also on the ability of the operating department to produce the required tonnage. Quite often, production drops off due to causes over which there is no control, and this hurts the reputation of the maintenance department.

To obtain efficiency, maintenance supervisors should originate and enforce a definite policy of service. Maintenance competes with every outside service—the service shop, machine shop, etc. Its justification lies in its ability to produce service at a cheaper price than those on the outside. As outside service men depend for their existence upon ability to attract and retain customers, so the maintenance department should extend this same kind of courtesy and consideration to their customers who are the foremen and operating heads of the mill. First of importance in the mill is the operating group. Maintenance men are a service group only.

Results come to the maintenance man from development, organization and records. The maintenance group is difficult to supervise, since they work in out-of-the-way places and there are no witnesses. Very often one is called upon to go out on his own initiative and be responsible for a job, and who knows whether, when he sees a particular defect, he will notify the superintendent, or when by himself, he will wear goggles and have his ladder equipped with non-slip pads.

Mr. Ferrell found out long ago that every man has inborn loyalty to some one or some thing. And every man has his own kind of pride. Some have pride in appearance; others in workmanship. When in charge of the electrical department, he said he recognized very early the existence of these traits and resolved to take advantage of them. He set his men up with a superiority complex, making them believe they were very intelligent. There was a record they must defend and on a construction job, the electrician would as soon lose his right arm as to let someone get ahead of him. Working on their element of pride, he suggested they could buy uniforms, and they did. Of course, that was in the better days. When he was transferred to the Maintenance Department, he took care to leave a good foreman in charge.

Organization—Mr. Ferrell defined Organization as being a proper distribution of authority, responsibility and effort in order to achieve the highest possible efficiency.

Many men, he said, do not know what constitutes the proper distribution of these elements. There is nothing sadder in industry than a foreman or supervisor who through fear of his job, or egotism, fails to distribute properly these three elements. There is nothing so conducive to growth as to inspire workers with deserved praise; nothing which cramps efficiency more than to put men in a particular groove and keep them there.

Records—There are two kinds of records, he said, informatory and supervisory. The informatory tells what has been done in the past, what is being done in the present, and will be done in the future. These are vitally important to a maintenance man. Supervisory records help to prevent rather than repair trouble.

"We try every way to prevent trouble," Mr. Ferrell said, and in order to do this we employ the tickler system. We determine by experience how often it is necessary to inspect or test equipment, and this is put down on cards. There is a card for each machine. We may inspect the machines whether it seems necessary or not, and we mark down the date and the man who did it. This is done as a safety measure. There are regular inspections of elevators, cranes and locomotives."

Discussion—In reply to a question whether a certain man is made responsible for a job, Mr. Ferrell answered affirmatively. The major part of jobs are done by teams. Where there is a larger job, a key man is put in charge, and it is up to the helpers to get along with him.

A question about clean-up was answered by saying there had been trouble in overcoming sloppy habits. Now men and foreman are called back if waste is found and the honor of the department is impressed upon them with the result that their pride makes them more careful.

"Are minor jobs ever done by any but the Maintenance Department?" asked a speaker. Mr. Ferrell replied "Yes, but it isn't best. The ideal condition is for the operating department to have nothing to do with such minor things as putting dressing on belts, etc. There is danger when they do."

A question regarding comparative hazards of using stick or liquid belt dressing evoked some discussion with no defi-

nite conclusion. One spoke of a man who had been killed using stick dressing, and the liquid was thereafter used as a safety measure, but there were objections to this, so a vote was taken and it was equal. Both kinds are now used, and a certain man is appointed to apply the dressing he chooses and is instructed in its use.

Safety Exchange Round Table

A safety exchange round table was the last number on the program. This open forum on paper and pulp mill safety problems was conducted by J. J. Pizak, safety director, Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis. The questions and answers in part were as follows:

Q—What are the hazards and how can they be eliminated when welding and cutting in tanks and other small and unventilated places? **A**—Suggestion was made to write the American Welding Society, 33 W. 39th Street, New York City, for their booklet on the question.

Q—What, if any, are the hazards in connection with working in clay dust without respirators? **A**—There has not been found any particular danger in papermaker's clay. Free silica is the harmful dust.

Q—In recording of lost-time accidents, what attention should be paid to analysis of cause, showing to what degree the human factor was responsible? **A**—The problem of analyzing accidents and arriving at the most important cause is one that has caused controversy. A good principle to follow in the selection of a mechanical or personal cause when investigation points to more than one of either type, is to record the one most easily removed and the removal of which would have helped most to prevent the accident.

Q—What system do you find best in your plant to control proper use of hand tools? **A**—E. J. Smith of the Western Electric Company, Chicago, said they have an inspection that is unique. Each department is written on a card. The names of foremen are on other cards. They are shuffled separately and three cards from each are drawn. The three foremen's names are appointed to one of the three departments drawn. Each foreman does not know beforehand what department he is going to inspect, and no department knows when it is going to be inspected. The inspectors make out regular reports and these are kept by a committee for one month. If any department is in bad shape, tools out of place, etc., it has an opportunity to correct it before the next inspection. In the case of hand tools, there must be no broken handles, sprung pliers' jaws, and such, and none must be out of place. It is not cared who owns the tools. Some men like their own better but each tool and piece of equipment is inspected regardless of who owns it. If a tool is broken, it is thrown away and replaced rather than reconditioned.

Q—Has anyone given thought to using the magic eye for a safety measure? **A**—It has been used for detecting broken paper. It also has been applied to freight elevators but not so much for general safety work.

Q—What should be done in a difficulty to get men to use goggles? **A**—Ask an optical salesman to come into the plant and give a demonstration on the high percentage of vision with modern types of goggles.

Q—Is there a logical solution to determine whether a strained back has been caused in the plant or out of it? **A**—Mr. Pizak said that his company makes a physical examination. Anything that might cause trouble with the back is corrected. They find out as much as possible what employees do after they leave work. Ernest Augustus of Mead Corporation, Chillicothe, Ohio, said he received a lengthy tract on how to determine whether an injury is real or false. He will be glad to loan it.

Q—What protective measure can be taken against defective equipment containing chlorine gas? **A**—Mr. Grant said his company furnishes men with gas masks at three points of vantage, so that approach can be made from the opposite direction to which the wind blows. The fire hose is then turned on the leak.

Q—What development has been made in perfecting a guard for the guillotine cutter? **A**—A guard on a guillotine cutter that is a series of wooden pegs which drop out ahead of the knife to keep longest finger from the cutter was said to be now in working condition at the Otis mill of the International Paper Co., Chisholm, Maine. The General Electric Company Thrustor two-button control is a well-known device.

Q—Is there an effective elevator guard? **A**—Mr. Pizak said he has perfected an automatic gate which does the following three things: (1) When elevator is standing at landing, gates will be down; (2) elevator will not start when loading or unloading, and (3) elevator is closed on all four sides to keep men from being thrown off or having freight thrown against them.

The meeting was then adjourned.

Major trophy awarded by The Paper Industry

Ladies Enjoy Special Features

Typical hospitality such as one expects to find in the city which is the gateway to the South, was shown to the lady visitors numbering more than two hundred. Special buses carried them on Tuesday to a complimentary box party at the famous Churchill Downs, the home of the historic Kentucky Derby. On Wednesday the same buses took them on a circle tour of historical nearby cities including a visit to My Old Kentucky Home and the historic Cathedral at Bardstown; the Abraham Lincoln Farm and Memorial at Hodginville and an enjoyable luncheon, in true southern style, at Elizabethtown. Louisville and its many show places were visited on Thursday.

The Industrial and Public Safety Exhibits

The safety exhibits were located in two hotels. The Industrial Exhibit was on the mezzanine floor of the Brown, and the Public Safety Exhibit was on the tenth floor of the Seelbach. Hundreds of safety products and traffic control equipment were on display and the arrangement of booths and decorative scheme was styled the Safety Derby.

◆ ◆

◆ THE ANNUAL MEETING of the National Paperboard Association will be held at the Waldorf-Astoria Hotel, New York City, Thursday, November 21. This meeting is called for the election of officers for the ensuing year and for taking such other action as is specified in the By-Laws of the association. An interesting program has been arranged.

Money for Modernization

ROBERT B. SMITH
Assistant to the Administrator
Federal Housing Administration

WITH the paper industry noting a definite and well-grounded upturn, manufacturers are taking up the problem of putting their plants in condition to meet new demands by modernizing and repairing.

This calls for expenditures which in turn call for credits, and the Federal Housing Administration, operating under the National Housing Act, offers the easiest and most convenient way of getting insured credit from private financial institutions if the requirements are not in excess of $50,000.

From this it should not be inferred that the Government is lending the money through the Federal Housing Administration. This is done by private banking and other lending institutions. What the Government does is to encourage these institutions to make the necessary advances by insuring them aginst losses.

With this guarantee, the timidity which has marked lending operations during the past five years largely has been eliminated. Where it has been difficult, if not impossible, for the manufacturer to obtain credits, regardless of his business integrity, the lending agencies are now willing to meet his requirements.

It would be desirable to explain here the mechanics and operation of this legislation under which a total of more than $180,000,000 already has been advanced under the insured credit plan. As originally passed, the act fixed a maximum of $2,000 for modernization and repair. This limited the field to the small home, stores and other small businesses.

An amendment to the Act later increased the maximum insured credit to $50,000. This was designed to aid larger businesses and industries in the same manner as the small business and home owner.

This has been hailed by business and industry of all kinds as a long step in the right direction and already is proving a great stimulus to the economic recovery of the country. Manufacturers have taken it up and it is forming an important element in their sales program.

It is no longer possible for the man of good business standing to offer the excuse—too frequently an honest one: "I should certainly like to make the purchase. I need it. But I have tried and can't get the credit. It will just have to wait until times get better."

Now it is a simple matter for the salesman, the manufacturer or the prospective purchaser to take advantage of the Act. In the event that the prospect is not familiar with the Housing Act, the manufacturer and the salesman may point out the simple manner in which credit may be obtained.

The terms or charges are more attractive than ordinarily could be obtained even if the bank were willing to make the loan. They are easily understandable. The charges may not be in excess of the equivalent of a $5 discount for each $100 face value of a one-year monthly installment note. The sum is to be repaid in equal monthly installments spread over a period up to five years. The charge of course, may, be at a lower interest rate.

Aside from the low rate, there is the added advantage that the money is advanced in a lump sum in cash and the borrower is in a position to take advantage of a cash discount, which in many instances will either offset or materially reduce the carrying charge.

Another attractive feature is the elimination of red tape and the expedition in passing upon the loan. If the credit risk is considered sound it is but a matter of a few days and often it is done in the course of two banking days.

The Federal Housing Administration insures the banker against losses up to 20 per cent of the total of all of his modernization credits. Considering that losses on this type of credit have seldom reached three per cent it can be seen readily that insurance in this amount is in effect an ironclad guarantee.

It is true that although the Act has been in operation more than a year defaults have been so very few.

The transaction is conducted along the line of ordinary banking practice. The banker may require adequate security on larger loans and the Housing Administration expected him to do so since the funds are being advanced by his institution and not by the Government.

Insured credit is not difficult for borrowers of good credit standing to obtain.

The next question of importance is that of the eligibility of the purchases to be made with the credit. This is covered by the rules and regulations of the Federal Housing Administration.

In entering into contracts with banks to insure them against losses and give them the classification of "approved" or authority to make insured loans the Federal Housing Administration set forth certain regulations.

For instance, the bank would not advance a loan to purchase electric fans, typewriters and other light office fixtures. The general principal is that it would include all production equipment and machinery adaptable to the business to be purchased and installed on a property already improved by or to be converted into a manufacturing or industrial plant.

In all probability, most of the machinery used in the paper and pulp industry would come within this classification and be considered eligible. Broadly speaking all repairs or improvements to the structure are considered eligible.

The list of eligible machinery and equipment upon which rulings of eligibility already have been made is far too extensive to be published here, but a good understanding may be obtained from the following simple guides:

1. The article should have a unit value sufficient to justify the application of time payments to its purchase.
2. The article should be of a durable nature with a reasonable expectancy of useful life longer than the term of credit extended for its payment.
3. It must be purchased and installed as a part of the equipment of a structure, or of the business conducted therein.
4. Loans for the purchase and installation of replacement parts for eligible equipment are insurable, but a loan merely for the repair of a machine is not. For instance the repair of a flywheel would not be considered eligible, but the purchase and installation of a new flywheel would be.
5. Appurtenances that are physically separate from a major eligible unit, but are usable only as a part of such unit, are themselves eligible.

The paper and affiliated industries unquestionably find themselves in much the same situation as other industries. During the five lean years there has been tremendous depreciation both to the building and to the machinery. There has been no money available for maintenance and the manufacturer has been forced to get along as best he could.

Facing a new demand for greater production and the absolute necessity of meeting competition he must get his plant in up to the last minute condition.

It opens the way for the manufacturer to increase production at lower costs and consequent increased profits.

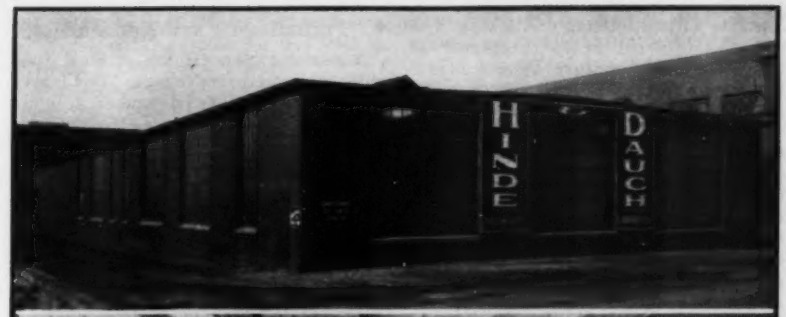
It also insures his investment, for by modernizing, repairing and restoring his establishment to good condition he either restores the value of his investment or in many instances materially increases it.

In effect, it means that modernization actually means profit and not an idle expenditure.

It should be a simple matter for the manufacturer to survey his plant and determine his needs. Then go to an approved banking institution. There are thousands throughout the United States and in all probability one in every community.

If the credit risk is a sound one, there will be no delay whatever and the applicant will receive a credit commensurate with his standing and ability to meet the obligation.

In the paper industry in particular there is a feature of the housing act which does not necessarily apply to all industries. Many of them house their employees on the property near the mill. If these houses are dilapidated, as many of them are, insured credits may be obtained to modernize them and make them more comfortable homes.



Hinde & Dauch's New Laboratories

The accompanying illustrations are exterior and interior views of the new laboratories of The Hinde & Dauch Paper Company, Sandusky, Ohio.

The establishment of the new laboratories was occasioned by the need for releasing floor space in the operating departments where the chemical laboratory and box design and testing departments were located, also the need for a more central location for the laboratory, more room and increased facilities for development, research and testing.

The laboratories are now housed on the ground floor of the Sandusky box plant in a wing of a building formerly used for garage and storage purposes. This location was selected because of its availability and because it is most conveniently located with reference to box and paper manufacture. High ceilings, skylights and large windows on three sides give excellent ventilation and light.

The rooms are heat insulated by Ideal Insulation manufactured by The Hinde & Dauch Paper Company. Constant temperature and humidity are maintained in a specially built separate room.

The equipment comprises most of the usual paper testing instruments in common use, including tumbling drum for box tests, and compression machines and instruments for rigidity determinations on boxes, container material and paper. The chemical laboratory is equipped with the usual apparatus and certain special machines for analytical work and chemical research.

Although the equipment is fairly complete at present, new facilities will be added as needed.

◆ Du Pont Announces New Products

Three new products have recently been announced by the Dyestuffs Division of E. I. du Pont de Nemours & Co. These include Lithosol Fast Orange G Powder (Patent Applied For), Pontachrome Brown HN Concentrated, and Ponsol Brown AGG Double Paste (Patented).

Lithosol Fast Orange G Powder, the most recent addition to the du Pont range of lake colors, produces bright, reddish shades of orange. It will pass the 24-hour Fadeometer test for wallpaper light fastness and is also of interest as a fast orange for printing inks. It may be used for out-of-door poster work. It should find further use as a shading color to produce medium chrome yellow shades in combination with Lithosol Fast Yellow HV.

Du Pont Pontachrome Brown HN Concentrated, a recent addition to the line of chrome colors is said to yield deep, reddish shades of brown on wool rawstock, yarn, and piece-goods. It may be used alone or in combination with other chrome colors for dark browns, tans, yellowish browns and olives. It is particularly recommended for use on men's suitings and overcoatings.

Ponsol Brown AGG Double Paste, a new vat dye, has recently been added to the du Pont line to provide a fast color to be used as a yellow brown base for current khaki shades. It possesses the usual good fastness of the vat type of dye, and, when dyed by the pigment-pad process, does not change its shade on soaping or during the various finishing operations. Ponsol Brown AGG Double Paste, it is stated, is suitable for use in the production of current khaki shades.

Lithosol, Pontachrome and Ponsol are registered trademarks of E. I. du Pont de Nemours & Co., Inc.

◆ Fort Orange Paper Co. Beats the Depression

The Fort Orange Paper Company, Castleton, New York, has been complimented by the publication of an interesting article prepared by John Wanhope and published in the *Albany Evening News* recently.

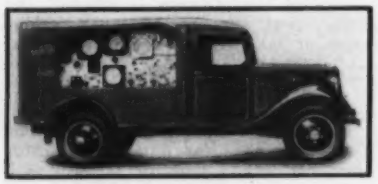
The author has prepared a series of articles about business conditions in the Capital District communities. The interview with Colonel Peter Brashear, the Orange Paper Company's president, was the second of the series to be published.

Castleton is really the paper mill's own community, since one of every three persons living in the village is employed in the paper mill.

According to "Uncle Peter," as the company president is known locally, the company has hardly known there was a depression. The company manufactures all types of cartons and paper packages, and at present has 500 persons on the payroll. The plant is running full time and President Brashear steadfastly asserts that business will go forward to much better times if allowed to do so.

◆ Control Equipment Field Demonstration Service

The Mason-Neilan Regulator Company of Boston, Mass., has inaugurated a new field demonstration service in which a specially designed truck, equipped completely with up-to-the-minute reducing valves and control instruments, is being utilized in a nation wide tour.



The complete demonstration is under the supervision of a Mason-Neilan control engineer who discusses problems, answers questions, and gives ideas on cutting maintenance costs.

The demonstration unit, offered as a free service wherever it goes, makes it possible for plant executives, process men, power plant engineers and instrument men to bring themselves up to date on control. New York, Philadelphia, Pittsburgh, Toledo, Chicago, St. Louis, Tulsa, and Houston are some of the larger cities included on the itinerary.

◆ Temperature Control Unit

A new temperature control unit for use in dead air spaces where it is necessary to keep the temperature from exceeding any predetermined limit is announced by the Edison Electrical Controls Division of Thomas A. Edison, Incorporated. This control unit consists of a small glass enclosed thermostat mounted with a suitable guard in the cover of a standard 4 in. x 5 in. switch box. The thermostat operates a glass enclosed relay, mounted inside the box, which is capable of carrying up to 400 watts. These two elements are wired to a readily accessible terminal board.

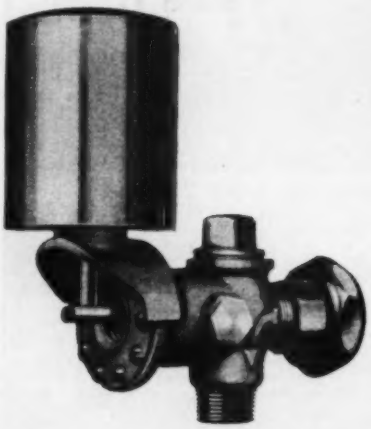
In both the relay and the thermostat, all air is removed and the glass encas-

ing tubes are filled with an inert gas of high thermal conductivity before the final seal is made. This prevents any destructive arcing when the contacts open and thus assures long life of the contacts without pitting or sticking. The thermostat is calibrated to operate at the desired temperature by the manufacturer and subsequently cannot be changed.

A typical application for this temperature control unit is in dry-valve housings for sprinkler systems. The thermostat may be set to close the circuit and operate a small electric heater when the temperature gets too low and there is danger of the valve freezing. Thus complete freedom from ice in the sprinkler system is assured. There is no danger of a fire protection system being rendered useless by cold weather.

◆ New Control Valve

Lammert & Mann Co., 262 N. Wood St., Chicago, Ill., has announced a new control valve which utilizes interchangeable elements that permit control of the valve with air, steam, water, or electricity—the desired control being obtained by screwing the respective element into the standard valve-body



mechanism. The valve likewise can be adapted to automatic operation, remote control, or automatic operation plus an interlock with a manual-reset device.

The air control mechanism is of the piston type and permits a pressure of 3 to 50 pounds to be used; while the pressure in either the steam or hydraulic control operates through a bellows, and the electrical control through an electro magnet. The interlock and manual-reset device is a latch and weight arrangement which holds the valve in position after it has closed and until the weight has been reset manually.

The control device actuates an operating lever which lifts a stainless steel needle valve from a stainless steel seat. A cadmium-plated spring holds the valve firmly in position when closed. The whole valve assembly can be taken out after removing a single screw plug. In fact, any part of the valve can be removed in a few seconds without detaching the valve from the line.

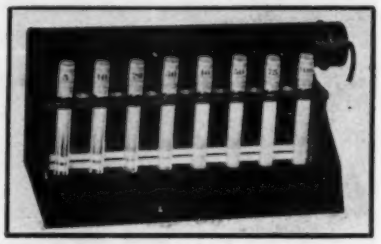
Action of the valve is said to be extremely responsive and rapid, and no lubrication is needed at any point.

The valve is made in standard sizes from ⅜ in. up.

◆ Turbidimeter and Nephelometer

A recent announcement of R. P. Cargille, manufacturers' agent, 118 Liberty St., New York City, describes a lamp, known as the Clark lamp—Model C, for the visual side-by-side comparison of solutions in test tubes or for observing minute traces of any precipitate, or of any insoluble or suspended matter.

One convenient tubular lamp provides



illumination. The housing of the lamp is of copper, and Bakelite is used for the tube rack.

The tubular lamp provides a constant source of light approximating intensified diffused daylight. This light illuminates the field under observation in front of an unlighted, black background. A black strip at bottom of rack enables the observer to make comparisons by transmitted light or turbidimetrically.

◆ Surface Illuminator for Microscope

A surface illuminator that may be used with the 48, 32, and 16 mm. microscope objectives of any conventional monocular laboratory microscope with a body tube diameter of either 35 or 39 mm. has been announced by the Bausch & Lomb Optical Co., Rochester, N. Y.

The illuminator consists of an annular ring holding six 2.5-volt, 0.3 ampere bulbs, in either clear or daylight glass, spaced equidistant around the inside of the ring with individual reflecting surfaces back of each bulb. The ring slips

on over the microscope objective and is held in position by an extension rod suspended from a clamp attached to the eyepiece adapter.

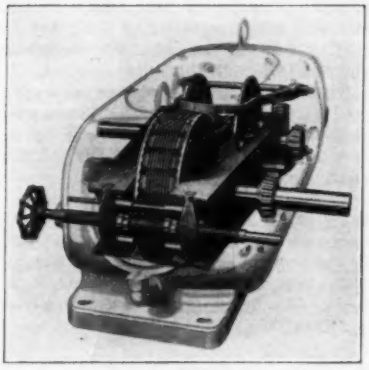
A transformer with variable resistance and switch for 110-volt, 50 or 60-cycle a. c. only is supplied with the illuminator and provides a means for dimming

the light to any degree of intensity. A converter is supplied for use with d. c. when a. c. is not available.

The illuminator is said to provide an improved method for illuminating opaque or translucent specimens when examined under low magnifications and to reveal a maximum of detail in objects with irregular surfaces.

◆ Motorized Variable Speed Transmission

Announcement is made by Link-Belt Company, Chicago, that certain features of design have been incorporated recently in its P. I. V. Gear variable speed transmission, which will permit the entire line to be furnished in the following combinations and sizes: Motorized (when desired), with motor forming an



integral part of the unit; with or without speed reduction gearing; with horizontal or vertical box; and in five sizes up to 15 hp. capacity.

Previously, P. I. V.'s were available in sizes up to 10 hp., with horizontal box only, and without reduction gear sets or the integral motor feature. The motorized construction is said to make a very compact drive, eliminating the need of a separate motor base plate.

◆ Coating and Lining Material

Maurice A. Knight, Kelly Ave., Akron, Ohio, has placed a depolymerized colloidal resin, known as Pyroflex, upon the market for application to various surfaces as a coating or lining material. This material, furnished in sheets 30 inches wide by 48 inches long and in thicknesses from ¼ to 1½ inches or in bulk—solid or in broken lumps, is stated to have a very low thermal conductivity, a tensile strength up to 300 lbs. per square inch at 70 deg. Fahr., and a hardness which varies with compounds and temperatures. It also is said to fuse at from 350 to 600 deg. Fahr. and to adhere firmly to all metal surfaces, concrete, wood and glass. Among the other properties claimed for it are flexibility, non-tackiness, and a resistance to the chemical action of any concentration of alkali, all salts of mineral acids, and to all mineral acids except over 50 per cent sulphuric, over 7½ per cent nitric, or chromic.

The application in sheet form to large surfaces is said to be quick, easy, and to require no special skill. Joints between sheets are welded together thus producing a continuous one piece lining. It also may be applied by troweling as a hot plastic dough, or in some of its compounds by dripping, spraying, or pouring while in the molten state.

More complete information upon this coating and lining material will be furnished by the manufacturer upon request.

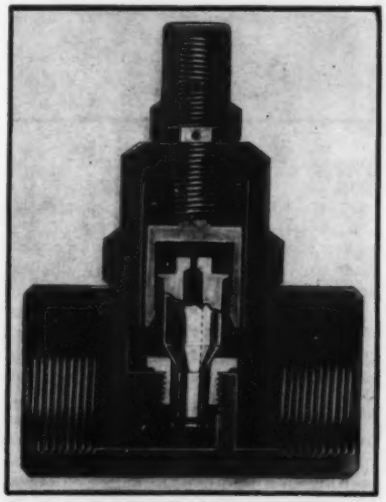
◆ Nickel-Copper Steel

The Youngstown Sheet and Tube Company, Youngstown, O., has announced the development of a nickel-copper steel. This product, designated as Yoloy, is furnished as sheets, strips, plates, pipes, unions, steel bars and shapes, and as wire and wire products as well as in other special forms. Among the advantages claimed for it are long life, strength, ductility, hardness, endurance, and resistance to abrasion, impact, and corrosion. Likewise, it is stated that this nickel-copper steel can be welded successfully by either gas, arc, or resistance processes.

For more detailed information about Yoloy address the manufacturer.

◆ Impulse Steam Trap

Yarnall-Waring Company, Philadelphia, Pa., has announced a steam trap that depends for its operation on the difference in flow characteristics of cold water, hot water and live steam, flowing through two orifices with a chamber between. The trap, known as the Yarway Impulse Steam Trap and made in six sizes, ½ in. to 2 in., has only one moving part—the valve disc. Movement of this disc is governed by variations in pres-



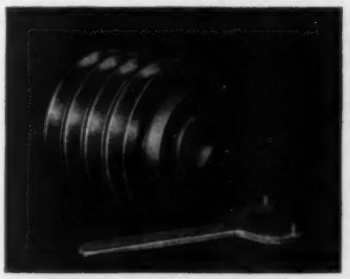
sure in the space above valve piston called the control chamber.

When handling cold water, the pressure under valve piston (inlet side of trap) is greater than the reduced pressure in control chamber above piston—clearance between piston and cylinder acting as first orifice—and valve opens to allow free discharge of condensate. As the accumulation of cold condensate disappears, the remaining condensate approaches steam temperature; flashing takes place in the control orifice in center of valve disc; the flow is choked; and the pressure in control chamber builds up to close valve. Valve disc, piston and center orifice are proportioned to give positive opening of valve when cold condensate collects and quick closing when pipe system is hot and there is no condensate or the condensate is at or near steam temperature.

The body of the trap is made of cold rolled steel; the working parts of hard monel; and the bonnet and cap of brass. Each trap is factory-set to operate all pressures from 0 to 400 pounds.

◆ Variable Pitch Diameter V-Belt Sheave

A V-belt sheave in which the pitch diameter can be changed by a simple adjustment to give variations in speed as high as 15 to 25 per cent per sheave or



doubled if both sheaves of a drive are of the new type, is being offered by Allis-Chalmers Mfg. Company of Milwaukee, Wis. This sheave, known as the Vari-Pitch Texrope sheave, is made in two multi-groove types—stationary and motion controlled. The stationary controlled type is recommended for applications that require occasional change of speed; while the motion controlled type is recommended for applications that require frequent quick changes within the full range while the drive is in operation.

The Vari-Pitch sheave, according to the manufacturer, is especially desirable for V-belt drives formerly employing several sets of sheaves to meet occasional changes in speed.

◆ Something New in Speed-Regulating Resistors

A new unit method of assembling, wiring, and shipping speed-regulating resistors for large a-c wound-rotor motors, which conserves space and facilitates installation work, has been announced by the General Electric Company, Schenectady, N. Y.

With the new method of construction, all of the resistor grid boxes for each drive motor, instead of being supplied separately are mounted in a fan-cooled sheet-metal cabinet with a convenient terminal board on the outside. The grid boxes within the cabinet are wired at the factory to provide the motor

speed characteristics desired, and the terminals, clearly marked, are connected to match up with those on the control panel.

This new type of resistor construction is recommended for drives of 100-horsepower or higher, because its advantages are best realized where many grid boxes are required.

◆ Rapid Penetrating Oil for Paper

A new non-hygroscopic, water-dispersible oil (Diglycol Laurate) is being produced commercially by the Glyco Products Co., Inc., 949 Broadway, New York City.

This oil is stated to be practically odorless, light straw colored, non-viscous and completely soluble in all proportions in alcohol, mineral and vegetable oils, and hydrocarbons. It also is said to be self-emulsifiable in water; to act as an excellent emulsifying agent for other oils and solvents; and to be non-toxic and edible. It has a low surface tension; is high boiling; and will not evaporate or thicken with age. The use of the oil in the making of emulsions for paper is one of the applications for which it is recommended by the manufacturer. It is suggested for use where rapid penetration is required.

◆ LINK-BELT COMPANY announces that effective November 30th its general offices will be moved from 910 South Michigan Avenue to larger quarters at 307 N. Michigan Avenue, Chicago.

◆ Personnel Changes at Northern Paper Mills

A number of changes in the executive personnel of the Northern Paper Mills, Green Bay, Wis., have just been announced by W. P. Wagner, president of the Company. Mr. Wagner has been acting as president and treasurer, but he will now be relieved of part of his duties by the appointment of Henry W. Tuttrup as treasurer and assistant to the president. Mr. Tuttrup has been a director of the company for several years.

Another new official is A. B. Hansen, who has been general manager of the Marinette and Menominee mills at Marinette, Wis. Mr. Hansen has been appointed general manager of the Northern Paper Mills to succeed Judson G. Rosebush.

Two other resignations have been announced, but to date no successors appointed. L. G. Wood, assistant general manager and vice president in charge of sales has resigned, effective immediately. Mr. Wood has been with the Northern for 14 years. Another resignation that will be a surprise to many of his friends is that of W. J. Peacock, well-known personnel and safety director of the company. His resignation will be effective January 1, 1936. Mr. Peacock will take an extended vacation before announcing his plans for the future.

◆ Small Medium-Pressure Acetylene Generator

A new small-sized medium-pressure acetylene generator for portable or stationary service with any type of oxy-acetylene cutting or welding apparatus has been announced by The Linde Air Products Company, 30 East 42d Street, New York. It is known as the Oxweld Type MP-6 Medium Pressure Generator, and has a 50-lb. carbide capacity with a double rating of 100 cu. ft. of acetylene per hr.

There is practically no exposed piping in the design and such operating mechanisms as the feed control, carbide hopper, hydraulic back pressure valve, and filter are all assembled within the

dome-shaped top of the generator. The dome may be tilted back if access to the interior is necessary.

A handwheel at the generator top makes it possible to control the carbide feed so that acetylene at any desired pressure up to 14 lb. per sq. in. may be obtained. The carbide feeding mechanism incorporates the same principle of gravity type, pressure diaphragm-control as the larger Oxweld Types MP-4 and MP-5.

It has been tested and accepted by the Underwriters' Laboratories at the double rating for generating capacity, and has been listed for both stationary and portable service. The generator can be mounted on a truck for transportation from job to job, or fitted for permanent installation to supply medium-pressure acetylene through pipe lines.

◆ THE GRISCOM-RUSSELL CO., announces the appointment of Farrell & Jones, 10 High Street, Boston, Mass., to handle the sales of its products.

◆ Great Northern Raises Price of Newsprint

Announcement was made on October 11 that the Great Northern Paper Company had increased the price of newsprint one dollar a ton for 1936 delivery.

This advance is the first in newsprint prices since 1931, and establishes a price of $41 per ton on contracts for next year's delivery.

◆ Worthington Enlarges Its Buffalo Works

The Board of Directors of the Worthington Pump and Machinery Corporation has authorized the construction of an additional machine shop building at its Buffalo, N. Y., Works, this extension to cover a floor area of 75,000 sq. ft. The new building will supplement the present capacity of the Buffalo Works and will add materially to the plant facilities for the manufacture, assembly and testing of its products.

The local management is now proceeding with the work and it is expected that the building will be ready for occupancy about the first of the coming year.

◆ THE KENNEDY VALVE MFG. CO., announces the appointment of William Godbey as its representative in Kansas, Nebraska, Western Missouri and S. W. Iowa. His headquarters will be in Kansas City, Mo.

◆ Trimbey Plant Busy

The Trimbey Machine Works, Glens Falls, N. Y., reports a number of screens for shipments to paper mills in different sections. Considerable equipment has recently been completed and is now in operation in several paper mills.

The Trimbey company is also making a shipment to Russia the early part of November.

◆ ROBERT CHELSTROM, New England representative of Oster-Williams, Cleveland, Ohio, was killed in an automobile accident, Friday, October 18th, while returning to his home in Boston, from a trip to Connecticut. He was 59 years of age at the time of his death.

◆ Foster Wheeler Honors Vice President Primrose

John Primrose, who has been vice president of the Foster Wheeler Corporation since it was organized, has been elected to the office of vice chairman of the Board, following the resignation of Pell W. Foster, who will continue as a director.

In 1901 Mr. Primrose became chief engineer of the Power Specialty Company and subsequently vice president in charge of oil refinery activities. When the Foster Wheeler Corporation was formed, Mr. Primrose was elected a vice president, which office he has held to the present. Through these associations he has become well known in the oil refining industry in this country and abroad.

◆ C. H. Marshall Establishes Calibration Service

C. H. Marshall, 42 Whitney Rd., Short Hills, N. J., who until recently operated a repair department for Testing Machines Inc., is no longer connected with them but has installed considerable additional equipment and is now prepared to take care of the repair, reconditioning and rebuilding of all kinds and makes of testing equipment including dial micrometers, small scales, Tensile testers, folding testers, pressure gauges, speed indicators, temperature regulators, electric meters and other equipment used in plants and laboratories.

Mr. Marshall has had many years' experience in the supervision of laboratories engineering and design of testing equipment and is well qualified to handle any sort of work in connection with testing or testing equipment. He has established a calibration service which should be of interest to all users of testing equipment.

Improvements which he has developed in connection with repairs may be incorporated in rebuilt testing equipment.

While Mr. Marshall is specializing in repair, rebuilding, design, and construction of equipment for testing paper, he is also equipped to take care of all kinds of servicing, calibrating etc., of testing machines up to one million pounds capacity and has been appointed service representative for the Baldwin-Southwark Co., on their testing equipment.

◆ Oakite Industrial Conference in December

Nearly 100 Field Service Representatives of Oakite Products, Inc. will meet at their headquarters office in New York, December 9th to 13, 1935 in connection with the Annual Technical Sales Conference.

A large number of technical papers will be read dealing with the technical cleaning problems of many different industries. Mechanical improvements in production equipment that have occurred during the past year have, in turn, made necessary many changes in cleaning methods and materials and the interchange of ideas developed through the technical discussions at this coming conference, puts each Oakite field representative in a position where he can be more helpful to the industries he serves.

◆ Gummed Products Making Improvements

The Gummed Products Company, Troy, Ohio, manufacturers of gummed paper and tape, has been expanding and modernizing its plant. Six months ago a building program was started which called for expenditures approximating a quarter of a million dollars. It is hoped that the program will be completed very shortly.

When the plant is completed, it will be one of the largest, most modern and most complete gumming plants in the United States.

Twenty Year Club Organized at Cornell Wood Products

The accompanying illustration shows the charter members of the Twenty-Year Club, organized by the employees of the Cornell Wood Products Company, Cornell, Wis., who have been employed by that company for a period of twenty years or more.

The Cornell Wood Products Company has presented each member of the club with a gold ring which is inscribed with the club name.

The club members are (reading from left to right): Andrew Bork, Ben Russell, Ole Johnson, Thomas Smith, Earl Miller, Emmett Barney, Frank Stanek, Carl Johnson, George Rivers, Charles Popple, Morris Selmer, Archie Coggins, Tom Vasseur, Vincent McIntyre, George Barlbeau, Ed Simenson and A. W. Miller.

A. W. Miller, vice president of the company, and Emmett Barney, mill superintendent, are charter members of the club. The officers are: George Rivers, president; Charles Popple, vice president; Morris Selmer, secretary and historian.

◆ Allis-Chalmers Extends Line of Duro-Brace Texsteel Sheaves

Owing to their light weight, great strength and pleasing appearance, texsteel sheaves for V-Belt drives have become so popular that additional stock sizes have just been added by Allis-Chalmers, now making it possible to furnish duro-brace texsteel drives up to 15 horsepower.

The grooves of the entire texsteel line are so designed that they can be used with A section belts (½ inch x $1\frac{1}{32}$ inch) or with B section belts ($2\frac{1}{32}$ inch x $\frac{7}{16}$ inch) depending on the application. The standard line now includes 25 different diameters of sheaves from 3 inches up to 18 inches inclusive for any number of grooves from 2 to 6 inclusive, or 125 different duro-brace texsteel sheaves. All of these sheaves are now available with interchangeable type hubs which are carried in stock with bores in $\frac{1}{16}$ inch increments from ½ inch up to the maximum bore.

◆ APMEW Reports Good Business

The American Paper Machinery and Engineering Works, Inc., Glens Falls, N. Y., reports a very busy season with its plants operating near to full capacity. A number of orders for the APMEW line of varied equipment have been shipped to large paper mills and other orders are going through the plant.

A carload of machinery was recently shipped to a southern mill. This was the company's largest single shipment in five years.

◆ John B. Stickle

John B. Stickle, age thirty-five, Indianapolis, Indiana, was injured fatally when struck by an automobile in a fog near Westfield, Indiana, October 20th.

Mr. Stickle was born in Bennington, Vermont, March 24, 1900 and had lived in Indianapolis since 1905. He was a graduate of Emmerich Manual Training High School and studied at the Carnegie Institute of Technology and the University of Illinois.

Mr. Stickle has been president and general manager of the Stickle Steam Specialties Co., Indianapolis, Ind., since the death of his father, Cole Stickle, in August 1934.

His mother, Mrs. Cole Stickle, is the only survivor. Burial was in Crown Hill Cemetery.

Fred A. Stickle, a cousin of the deceased will immediately assume the management of the Stickle Steam Specialties Co. He has been associated with the Company for the past 20 years, having been Eastern Sales Manager.

◆ THE BABCOCK & WILCOX COMPANY announces the opening of a sales office at 1809 Railway Exchange Building, St. Louis, Mo. F. C. Brandt, formerly of the Chicago office of this company, is in charge of the new office, which will serve the eastern half of Missouri and the southern section of Illinois.

◆ FIBRE MAKING PROCESSES, INC., announces the removal of its Chicago office to The Tribune Tower. Telephone Superior 1046.

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BY REDUCING Insurance Compensation and Losses due to breakage, marring etc. of product.

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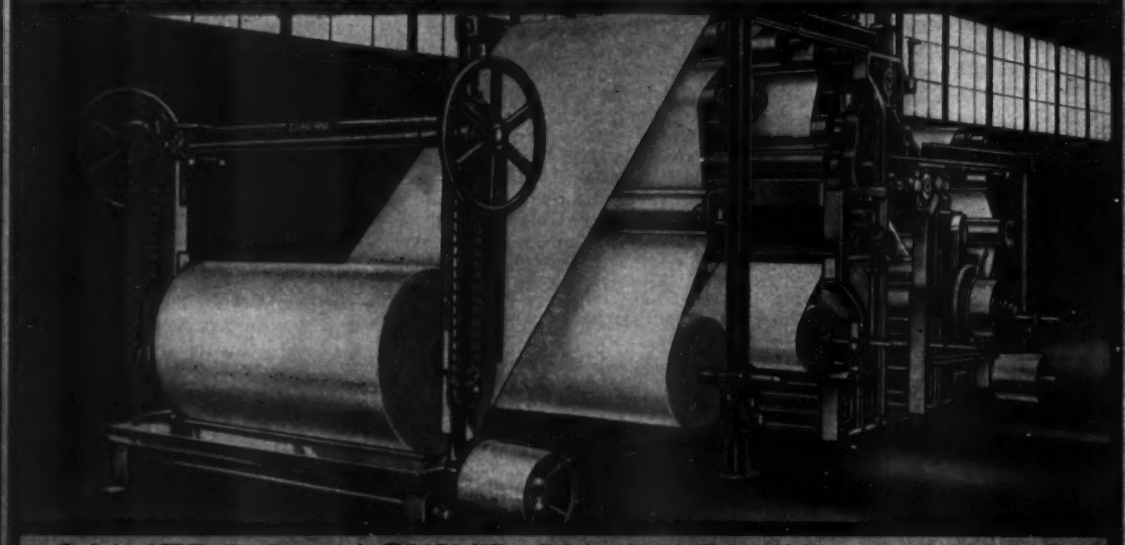

CAMERON MACHINE COMPANY BROOKLYN, N.Y.

◆ New Catalogues and Publications

Allis-Chalmers Mfg. Co., Milwaukee, Wis.—The subject of a new 32-page bulletin, No. 1259, is "Texrope Drives for Machine Tools." This bulletin illustrates 60 typical applications of the V-Belt drive to modern machine tools of all kinds. It is brought out that Texrope drives are fully standardized—almost any speed ratio may be had for a given motor speed. The presentation is largely pictorial in two colors, and is doubly interesting because at the same time it shows many of the latest machine tools in the market.

Audubon Wire Cloth Corp., Richmond St. and Castor Ave., Philadelphia—This company has recently issued a 56-page catalogue No. 40-33 covering its complete line, which includes illustrations, descriptions, specifications and list prices of its various products together with tables and useful information for selecting and specifying wire cloth. The book is divided into three sections, with marginal index, each section devoted to: (1) Mesh Wire Cloth; (2) Space Wire Cloth; (3) Flexible Wire Cloth. Each section contains specific instructions for ordering and tables of valuable data. There are many plates showing close-up views of the various kinds of mesh, also illustrations of typical applications. To obtain copies of this catalogue, address manufacturer mentioning catalogue number. There is also a 16-page catalogue, No. 41-33 which features Flexible Wire Cloth and an 8-page condensed catalogue, No. 42, which describes the entire line, but includes no specifications or list prices.

Bakelite Corp., New York City—To commemorate its Silver Anniversary this company has issued a very attractive blue and silver edition of the "Bakelite Review." The contents include chapters on: The History of the Bakelite Corporation; Acrographic Study of Bound Brook Plant; Foreign Affiliations; Reminiscences of the Old Timer; Bakelite Materials in Industry; and New Developments. The booklet is nicely printed on coated paper, and illustrated with a large number of fine pictures.

Bausch & Lomb Optical Co., Rochester, N. Y.—A new folder is descriptive of the new Ortho-Stereo Camera and Ortho-Stereoscope, for true three dimensional records at 1 to 24 diameters. The description is concise but complete, the camera and stereoscope are illustrated and list prices are given.

Foster Wheeler Corp., New York City—Bulletin RA-35-5 is devoted to this company's Ruths Steam storage systems. There are charts and illustrations showing that when the steam production exceeds plant demand the surplus is stored in the accumulator by condensing it in the water contained in the accumulator. The bulletin contains a diagrammatic sketch of typical layout of steam storage system for a paper mill, indicating piping arrangement. Copies may be had from the main office or any branch.

General Refractories Co., Philadelphia—A new pamphlet entitled A New Application of the Ritex Process to the Manufacture of Chrome Brick, has been written by R. P. Heuer, Director of Research of the company. Copies on request.

Goetze Gasket & Packing Co., New Brunswick, N. J.—This company has just issued Catalogue 48 on metallic and semi-metallic gaskets, sheet and stuffing box packings, sealing compounds, gasket cutting tools, valve discs, filter screens and metal stampings. This 64-page booklet describes many new gasket types, is well illustrated with halftones and blue print diagrams, size and price data and is prepared as a valuable guide to all who specify, purchase or use gaskets and packing. Copies on request.

Ideal Commutator Dresser Co., Sycamore, Ill.—A 4-page, file-size bulletin describes the improved Ideal undercutter, electrically driven, with micrometer gauge, used for servicing and undercutting commutator mica. There is much information of interest to men whose job it is to keep motors in repair, as this instrument saves hours of hard hand work, can be used in spaces as small as 2¾ inches without removing brush riggings and cuts to within ¼ inch of risers. Copies on request.

Johns-Manville, New York City—A new brochure-catalogue of J-M industrial friction materials of both flexible and rigid styles has just been published. It contains brief descriptions of the complete line of industrial friction materials, including the woven and compressed and the folded and compressed products of the flexible types and the friction block and moulded varieties of the rigid styles. Materials for facing both cone and disc clutches are also described. Copies on request.

Lawrence Machine & Pump Corp., Lawrence, Mass.—This company has just issued a new bulletin, No. 208, covering its standard dredging pumps. The construction of this line of pumps is fully described and there are a number of illustrations and tables giving capacities, speeds and power requirements for different sizes at various heads.

Lawrence Pump & Engine Co., Lawrence, Mass.—An 8-page bulletin recently issued by this company describes its ELECTRO-PUMP—a compact, low cost centrifugal pumping unit for small and moderate capacities. The bulletin is illustrated with pictures and cross-sectional diagrams of the actual equipment. Several pages are devoted to tables giving heads and capacities for the various pumps.

Lincoln Electric Co., Cleveland, O.—"Automatic Arc Welding by the Electronic Tornado" is the title of a new 42-page book just announced by this company. There is a full explanation of this system of automatic carbon arc welding developed by the Lincoln company, and a discussion of such subjects as: how the heat of the carbon arc is shielded in automatic arc welding; physical properties of welds made by the Electronic Tornado, how it simplifies automatic arc welding, etc. There are 23 pages devoted to descriptions and illustrations of typical automatic arc welding applications. Copies on request.

Linde Air Products Co., New York City—This company has available on request a 20-page booklet entitled "The Utility of Carbide Residue." It explains in detail how owners of acetylene generators may capitalize on their valuable residual by-product. The booklet also tells how carbide residue can be used as the principal ingredient in whitewash, fireproof cement, mortar, plaster, concrete or stucco. Formulas and hints for the preparation and utilization of these various covering agents and construction materials are given.

Manhattan Rubber Mfg. Div., Passaic, N. J.—Bulletin No. 6840 describes and explains the construction of Condor V-Belts. Numerous diagrams illustrate the technical data which should be of interest to all users of V-Belts. Another bulletin, No. 6808-B is devoted to an explanation of the construction of Condor Compensated Belt. Interesting installation views are shown while charts and diagrams illustrate the accompanying data.

Norma-Hoffmann Bearings Corp., Stamford, Conn.—A new bulletin just issued describes the latest edition to this manufacturer's line of precision bearings, the Norma-Hoffmann precision needle roller bearings, which are available in metric sizes from 12 to 150 m/m bore and are adapted to a wide range of loads and speeds.

Struthers-Wells Co., Warren, Pa.—A new and complete bulletin describes Mixing Equipment in a very informative style. The bulletin is well illustrated and will be sent upon request.

Worthington Pump and Mach'y Corp., Harrison, N. J.—Among the new publications recently issued by this company are: No. W-321-B7 on the subject of Monobloc open impeller centrifugal pumps for liquids containing solid, gritty or stringy material; W-450 B-24, descriptive of Worthington deep well turbine pumps, which the manufacturer claims will substantially reduce your water costs; W-210 B17, a pictorial folder on Worthington deaerating feedwater heaters, which have been designed to save fuel and increase boiler efficiency. Another publication is a folder dealing with a term-payment purchase plan which has been developed by this company to enable purchasers of its products to take advantage of the provisions of the National Housing Act as amended for industry.

Yarnall-Waring Co., Philadelphia—An illustrated folder contains a general description and diagrammatic illustrations of the Yarway Impulse Steam Trap, the standardized steam trap that is universally applicable to all trap requirements.

BOOKS

Procedure Handbook of Arc Welding Design and Practice—A revised and enlarged edition of this publication is announced by The Lincoln Electric Company, Cleveland, Ohio. The present volume is some 140 pages larger than the preceding one. Encyclopedic in scope and contents, the new Handbook contains 586 pages, divided into eight principal sections which deal with an important phase of arc welding. The text is written in a simple, concise manner and is profusely illustrated, there being over 700 illustrations consisting of detailed drawings and photographs. Practically every use and application of arc welding are covered. New features added to the book include the following: American Welding Society specifications for filler metal; method of determining the amount of current carried by the electrode; procedures, speeds and costs for making all types of welds in sheet metal; A.S.M.E. Boiler Code requirements for butt welds in heavy plate; hard facing of ferrous metals; examples of redesigning for arc welding; use of arc welding in making and repairing cutting tools and dies; speed of welding oil and gas pipe lines, etc. Written especially for the use of designers, engineers, welding supervisors and operators, the Procedure Handbook serves as a practical guide to all who are interested in arc welding. It also serves as a handy reference for estimating welding costs. The new Handbook is 5¾ x 9 inches, suitable for desk or shop use. It is bound in semi-Flexible simulated leather, embossed in gold. Copies will be mailed to any address in the United States for $1.50 per copy. Foreign Postage fifty cents additional.

U. S. Department of Agriculture—A new Wood Handbook, in which wood is defined in technical properties and behavior, is a publication of interest to wood users generally which embodies the results of 25 years of research by the Forest Products Laboratory at Madison, Wis. It treats of all the practical phases of wood use, including the mechanical properties of wood and the facts recently developed in regard to ring placement, fatigue effects, the various factors affecting strength; control of decay and insect damage, classification of woods for painting, timber for outdoor use, preservative treatment, and treating for effective fire resistance. Distinctly modern fields of use are covered in a section on glued, laminated, and composite wood construction. Copies of the Handbook may be obtained for 25 cents (stamps not accepted) from the Superintendent of Documents, Government Printing Office, Washington, D. C.

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STICKLE AUTOMATIC STEAM CONTROLS
DRAINAGE SYSTEMS FOR DRYERS AND HEATING SYSTEMS
CONDENSATION ECONOMIZERS FOR HEATING AIR
DEAERATING FEED WATER HEATERS, REDUCING VALVES
STEAM TRAPS, OIL AND STEAM SEPARATORS

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Paper Mills Reduce Operating and Upkeep Costs
with this
IDEAL
"3 in 1" Electric Cleaner

NEW—much more powerful than anything heretofore offered.

. . . does three things better than other cleaners—Blows, Vacuums, Sprays. Cleans motors—removes dust and dirt from hard-to-get-at places around winders, converters and other equipment. It is so portable that it cleans anything, anywhere. This **new model** super-powerful cleaner reduces your costs because it keeps machinery clean at **low cost** and clean machinery lasts longer, works better, gives you more efficiency. Try it! Watch it pay out! Write for **Free trial offer.**

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Papermaking Research Around the World, by Dr. Louis E. Wise.

Identification and Microscopy of Woods and Wood Fibers Used in the Manufacture of Pulp, by Ellwood S. Harrar and J. Elton Lodewick.

Lessons in Paper Making, Part 1, by Harry Williamson.

Lessons in Paper Making, Part 2, by Harry Williamson.

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Machinery for Ground Wood and Chemical Pulp

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◆ Paper Mills Sponsor Graphic Arts Exhibit

Among the sponsors of the 1935 All Media—Graphic Arts Exhibit, which is being presented in seven different cities, appear the names of the following well-known paper mills:

American Writing Paper Co., Holyoke, Mass.
Appleton Coated Paper Co., Appleton, Wis.
Crocker-McElwain Co., Holyoke, Mass.
Dill & Collins Co., Philadelphia, Pa.
Eastern Manufacturing Co., Bangor, Maine.
Falulah Paper Co., Fitchburg, Mass.
Gilbert Paper Co., Menasha, Wis.
Hammermill Paper Co., Erie, Pa.
Howard Paper Co., Dayton, Ohio.
International Paper Co., New York City.
Rising Paper Co., Housatonic, Mass.
Strathmore Paper Co., Woronoco, Mass.
S. D. Warren Co., Cumberland Mills, Maine.
Whiting-Plover Paper Co., Stevens Point, Wis.
Zellerbach Paper Co., San Francisco, Calif.

This exhibit is a presentation of the Direct Mail Advertising Association. A unique feature of the fall circuit of this exhibit is a 30-minute sound film entitled "Teamwork—The Drama of Advertising."

The exhibit was held at the La Salle Hotel, Chicago, November 6, 7 and 8. The sessions were very instructive and many ideas were given out by the speakers on the program.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF MARCH 3, 1933

Of "The Paper Industry," published monthly at Chicago, Illinois, for October 1, 1935:

State of Illinois, County of Cook, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Edward B. Fritz, who, having been duly sworn according to law, deposes and says that he is the owner and publisher of "The Paper Industry" and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Edward B. Fritz, 333 N. Michigan Ave., Chicago, Ill.; Editor, Harry E. Weston, 333 N. Michigan Ave., Chicago, Ill.; Managing Editor, A. Scott Dowd, 333 N. Michigan Ave., Chicago, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Edward B. Fritz, 333 N. Michigan Ave., Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is ..... (This information is required from daily publications only.)

EDWARD B. FRITZ.

Sworn to and subscribed before me this 21st day of September, 1935.

[SEAL] JANE A. DeWITT.

(My commission expires August 1, 1936.)

WHEN paper mill men say of pipe, "It's the top," you know it *has what it takes.* That's what these experienced pipe buyers say of Armco Spiral Welded Pipe, the pipe that is easy to get, easy to install, and mighty easy on maintenance budgets. Ordering Armco Spiral Welded is simplicity itself . . . You mail us your specifications, tell us when you want it delivered, and this strong, light-weight, money-saving pipe will be set down on your receiving platform *right on time.* No waiting, no production delays; and you get the most efficient, economical pipe that ever took a load off a paper mill man's mind. Just send in those specifications—or ask us to help out on an unusual pipe problem. We'll be glad to.

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Immeasurably successful
Order today and
Reduce your felt costs

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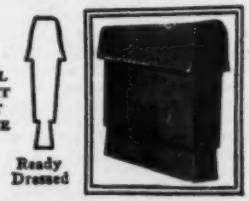

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of STAINLESS STEEL—COPPER—BRONZE—
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Perforations that are accurate in size and alignment
ANY METAL ANY PERFORATION

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5654 Fillmore St., Chicago, Ill. ◆ 114 Liberty St., New York, N.Y.

The Paper Industry Safety Contest

July 1, 1935 to June 30, 1936

Cumulative Scores as of September 30

44 Mills Maintain Record

PERFECT SCORES

Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A	Hollingsworth & Whitney Co.	Algonquin & Taconnet	Waterville, Me.
	Ohio Boxboard Co.	Rittman	Ohio
	Bryant Paper Co.	Kalamazoo	Michigan
	Eddy Paper Corp.	Three Rivers	Michigan
GROUP B	Kimberly-Clark Corp.	Badger-Globe	Neenah, Wis.
	Fraser Paper Ltd.	Madawaska	Maine
	St. Croix Paper Co.	Woodland	Maine
	Container Corp. of America	Cincinnati	Ohio
	Fibreboard Products, Inc.	Vernon	California
	Nekoosa-Edwards Paper Co.	Nekoosa	Port Edwards, Wis.
GROUP C	Continental Paper & Bag Corp.	York Haven	Pennsylvania
	Finch Pruyn & Co., Inc.	Glens Falls	New York
	International Paper Co.	Little Island	No. Tonawanda, N. Y.
	Crystal Tissue Co.	Middletown	Ohio
	Hoberg Paper & Fibre Co.	Fibre Div.	Green Bay, Wis.
	Consolidated Water Power & Paper Co.	Appleton	Wisconsin Rapids, Wis.
	Ontonagon Fibre Co.	Ontonagon	Michigan
	Kimberly-Clark Corp.	Lakeview Mill	Neenah, Wis.
	Harriman Company	Harriman	Tennessee
GROUP D	Port Huron Sulphite & Paper Co.	Paper	Port Huron, Mich.
	International Paper Co.	Webster	Orono, Maine
	Bird & Son, Inc.	Phillipsdale	Rhode Island
	Hollingsworth & Whitney Co.	Aroostook & Cobbossee	Gardiner, Maine
	U. S. Gypsum Co.	No. Kansas City	Missouri
	Central Fibre Products Co.	Vincennes	Indiana
	Spaulding Fibre Co., Inc.	New Mill	Milton, N. H.
	International Paper Co.	Livermore	Chisholm, Maine
	U. S. Gypsum Co.	Gypsum	Ohio
	Central Fibre Products Co.	Mt. Carmel	Illinois
	Hollingsworth & Whitney Co.	Abenaquis	Madison, Maine
	Spaulding Fibre Co., Inc.	Hayes	No. Rochester, N. H.
	International Paper Co.	Riley	Maine
	Mead Paperboard Co.	Rockport	Indiana

Division II—Remanufacturing

	Union Bag & Paper Corp.	Specialty	Hudson Falls, N. Y.
	Union Bag & Paper Corp.	Grocers	Hudson Falls, N. Y.
	Continental Paper & Bag Corp.	Elizabeth	New Jersey
	Kimberly-Clark Corp.	Atlas	Appleton, Wis.
	Container Corp. of America	Anderson	Indiana
	Container Corp. of America	Natick	Massachusetts
	Bird & Son, Inc.	Chicago	Illinois
	Texas Corrugated Box Co.	Dallas	Texas
	U. S. Gypsum Co.	Genoa	Ohio
	Pollock Paper & Bag Co.	Dallas	Texas
	Bemis Bros. Bag Co.	East Pepperell	Massachusetts

IMPERFECT SCORES

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP A	P- 44	5	1	2.670
	P- 27	6	6	6.619
	P- 62	7	4	8.144
	P- 1	8	6	9.665
	P- 10	9	4	10.187
	P- 19	10	4	10.308
	P- 67	11	6	10.382
	P- 12	12	4	11.353
	P- 18	13	6	11.770
	P- 69	14	5	12.280
	P- 2	15	5	13.106
	P- 13	16	7	15.781
	P-102	17	9	16.773
	P- 95	18	7	19.686
	P-114	19	11	26.256
	P- 87	20	11	28.627
	P- 74	21	15	32.652
	P- 73	22	17	35.879
GROUP B	P- 82	7	1	3.877
	P- 68	8	1	4.248
	P- 11	9	1	4.366
	P- 23	10	2	6.896
	P- 21	11	2	7.066
	P- 51	12	2	9.947
	P- 64	13	3	10.073
	P- 31	14	3	10.329
	P- 3	15	4	17.565
	P- 60	16	4	17.995
	P-112	17	4	20.108
	P- 16	18	5	22.826
	P- 25	19	5	27.050
	P- 76	20	7	30.357
	P- 40	21	9	30.562
	P- 32	22	10	34.672
	P- 45	23	8	35.019
	P- 77	24	11	50.289
	P- 71	25	19	64.069
GROUP C	P- 72	10	1	6.001
	P- 59	11	1	6.383
	P- 55	12	1	7.447
	P- 41	13	1	9.831
	P-103	14	1	10.902
	P- 75	15	2	15.276
	P- 4	16	3	17.871
	P- 37	17	3	20.270
	P- 6	18	2	20.300
	P- 29	19	3	23.002
	P-104	20	5	29.173
	P- 47	21	3	30.962
	P- 48	22	4	32.221
	P-111	23	4	33.016
	P- 34	24	4	37.839
	P- 14	25	4	38.756
	P- 88	26	4	42.592
	P-107	27	3	45.799
	P- 49	28	5	48.183
	P- 33	29	8	61.634
	P- 89	30	5	64.804
	P-113	31	14	97.255
	P- 50	32	12	123.515
GROUP D	P- 7	15	1	11.572
	P- 36	16	1	20.975
	P- 90	17	1	22.589
	P-116	18	2	24.402
	P-118	19	2	33.892
	P- 80	20	3	34.097
	P- 94	21	2	35.290
	P- 53	22	3	40.857
	P-117	23	3	43.381
	P- 8	24	3	48.403
	P- 98	25	4	56.540
	P- 42	26	3	64.576
	P-106	27	5	69.293
	P- 99	28	3	70.939
	P- 24	29	4	71.212

Division II

R- 5	12	2	7.448
R-21	13	2	8.729
R- 2	14	2	9.004
R- 1	15	1	9.832
R-18	16	1	10.707
R- 6	17	4	12.151
R-14	18	1	25.984
R-10	19	7	47.662

No September Report: Nekoosa-Edwards Paper Co.; Bird & Son (Chicago). P-25, P-88, P-89, P-107.

No August or September Report: Pollock Paper & Bag Co.

Withdrawn: P-79, P-83.

WHAT'S NEEDED HERE? ✳

▼ *A lead pipe?*

▼ *A dose of castor oil?*

▼ *Or a pair of good glasses?*

Last month we asked for bids on our 1936 calendar. It is a four-color job, nothing tricky about it, just a routine matter of plate making and printing. In fact, it was more than commonly simple to figure because we furnished the paper, art work, and composition.

Here were the bids:

Printer A $1970.00
Printer B 1098.00
Printer C 650.00

Draw whatever conclusions you wish. Ours is that what the business world needs is less wishing and more knowledge; less codes and more common sense.

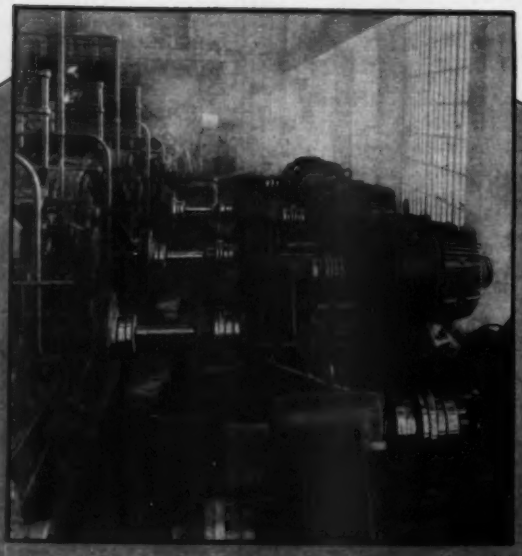
Uncle Jake

✳ *A souvenir will be sent to every one who sends a good answer.*

KALAMAZOO VEGETABLE PARCHMENT CO.
PARCHMENT (KALAMAZOO COUNTY) MICHIGAN

FAST'S

SELF-ALIGNING COUPLINGS FOR INTAKE SHAFTS



Fast's Couplings on sectional drives at Washington Pulp and Paper Company, Port Angeles, Washington

AN adaption of Fast's Self-Aligning Couplings makes the intake shaft in effect an integral part of the coupling. In this type of installation, the coupling is "split"—half of it is located at either end of the floating shaft. No supporting bearings are necessary. Their expensive upkeep, attention and replacing is eliminated.

Moisture and dirt cannot harm a Fast's Coupling. The rocking bearings are located in the one position where they will make dust-proof seals. The load carrying oil within the coupling is kept permanently clean.

Specify genuine Fast's all-metal couplings on the machines you purchase and avoid operating trouble.

The Bartlett Hayward Company

BALTIMORE, MARYLAND

POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Flame Impingement Causes Tube Failures

Combustion must be complete before the gas comes into contact with the brick work or boiler heating surface. This is where the great difficulty lies in the burning of oil fuel. More brick work and tubes have failed from flame impingement than from any other cause. Where brick work fails rapidly in oil fired boilers it is not due entirely to high furnace temperature but to the fact that where impingement occurs the brick becomes saturated with oil, which soaks into the hot brick work and causes it to disintegrate.

Blow torch effect of the flame is augmented as the rating of the boiler and the velocity of the gas increase. If the furnace volume is too small for high ratings and continuity of service is required, it is advisable to operate the boiler with a higher per cent of excess air. One per cent drop in CO_2 will shorten the flame several feet and perhaps stop the impingement and minimize the danger of tube failure.

◆ Commutator Insulation Failures

Commutator insulation failures are very annoying and aggravating. In a large plant, these troubles usually do not come singly. One motor after another may fail. When the motor is again placed in service after being repaired, the trouble may occur again after a period of operation that is entirely too short. The reason is that where certain conditions exist, there will be trouble, and as these causes often extend to hundreds of motors in the same plant, many motors will be affected.

A well built commutator, properly maintained, will give little operating trouble. Commutator failures are usually the result of the following general conditions:

1. Carelessness and neglect.
2. Lack of understanding of the principles underlying the construction and operation of the motor.
3. Indifference of the operator, who is more interested in output than maintenance expense.
4. Improper construction of rebuilt commutators.

Practically all commutator insulation failures are caused by one or a combination of the following causes:

1. Rough burrs on the bars or clamping rings.
2. Excessive voltage between bars due to turns being cut out of armature, etc.
3. Carbon dust or other conducting materials under the bars.
4. Oil between the bars or at the edge of the bars, causing pitting which eventually burns through the mica V ring.
5. Mill dust, carbon dust, copper slivers, moisture and oil on the exposed parts of the V rings, causing insulation failures, unless precautions are taken to protect them and keep them fairly clean.

Usually, the fundamental causes are due either to oil or to conducting dust, although there are many contributing factors. The oil may have come from the bearings, if there are no oil throwers on the shaft, or it may have been spilled on the commutator accidentally when oiling the bearings, or oil or some other lubricant may have been applied to the surface of the commutator bars by the operator with the object of improving commutation.

Mill dust, or carbon dust from the brushes, if allowed to collect in some pocket or crevice, bridges across the mica between two bars and causes failures. Dust usually accumulates on the exposed insulation at the ends of the bars and even works its way under the bars. Small slivers of copper caused when turning or machining the copper, or when undercutting the commutator mica segments, may be the cause of trouble.

◆ Entrained Water in Turbine Oil

Every possible effort should be made to prevent water from getting into the oil circulating system of a steam turbine. Water has an emulsifying effect upon the oil, particularly if the water contains impurities. Where considerable quantities of water leak into the circulating system and emulsification takes place, the mixture becomes yellow or brownish-yellow in color, loses its clear amber appearance and becomes opaque. If a sample is taken out and heated, it will separate into clean oil at the top of the flask, a more or less milky or cloudy water at the bottom and a spongy or slimy sludge between the two. The clean oil will be found darker in color and heavier in body than the original oil and will have a strong characteristic odor.

When subjected to rapid circulation, especially in small systems, the oil and water form an objectionable mixture which clogs the screens, baffles and ports, forms a slime on the interior surface of the cooling coils, accumulates in the clearance spaces throughout the system and tends to obstruct the passage of the oil, thereby cutting down the supply of oil to the bearings and causing a rise in bearing temperature. This mixture will generally become hard and may even cause a partial stoppage of the oil in the oil lines. In such cases, the increasing bearing temperatures indicate an insufficiency of oil supply which demands an immediate shut-down of the turbine to cleanse the system thoroughly.

Water may get into the system from several sources. One source is the steam leakage of the gland packing of the turbine. The steam blows past the packings into the housings of the main bearings where it condenses and mixes with the oil. Where the main bearings of the turbine are water cooled the water may leak from the water jackets in the housings, into the bearings.

Where the leakage of water cannot be avoided, a water trap fitted in a vertical position to the bottom of the oil tank has been found to be of good service. The water, circulating with the oil, will separate to some degree and drain into the trap. Once there, it cannot mix with the oil again and should be drawn off every 24 hr., letting the water and sludge run until clear oil appears.

In view of the unfavorable influence of water upon the oil, it is well to remove each day, from the bottom of the oil tank, from 10 to 20 gal. of oil for treatment in a steam heated separating tank and later in a good filter. The purified oil should be returned to the circulating system at the same time that a corresponding quantity is drawn off for treatment. In this way, the vitality of the oil can be maintained for a greater length of time than would otherwise be the case.

It is good practice to have a large quantity of oil in circulation with large settling tanks in which the oil will have time to settle and separate from the air, water and other impurities contained in it.

Wherever feasible, it is a good plan to incorporate a good oil filter in the circulating system so that at least a part of the circulating oil is passing through the filter at all times.

◆ A SLIGHT AMOUNT of water in transformer oil will destroy its insulating properties to a marked degree. The water present in oil must not exceed 0.001 per cent in order to obtain a dielectric strength of 40,000 v.

THWING
PORTABLE pH METER
For Paper Makers

Reads Directly in pH Units

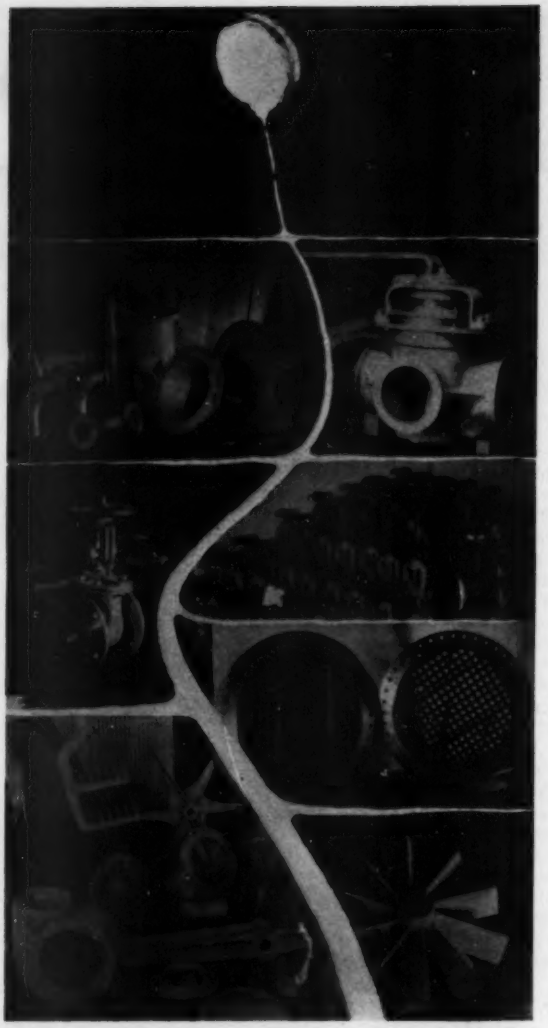
The Thwing pH Meter combines in a compact portable instrument all the equipment necessary for making hydrogen-ion determinations in paper mills. This instrument simplifies the matter of taking pH readings. In addition to its use for laboratory test work, it is so simple to operate that it can be used in the mill by men without any technical knowledge.

The Thwing pH Meter fits the many requirements for pH testing in paper mills from testing raw materials to checking the pH of the finished product. The regular periodic use of this instrument in adjusting the pH of white water and other waste liquors, prevents the loss of valuable material. It also is a very valuable aid in preventing complaints of stream pollution.

The range of the instrument illustrated is 0 to 12 pH, using quinhydrone and antimony electrodes. By incorporating a galvanometer of higher sensitivity in the circuit, this instrument can be used with glass electrodes for testing bleach liquors and other oxidizing or reducing solutions.

THWING
INSTRUMENT COMPANY

3353 Lancaster Ave. :: Philadelphia, U. S. A.



THE STEADILY INCREASI NG STREAM
of Durco Corrosion Resisting Alloy Steel equipment going to a score or more indus- tries is a more convincing testi monial than anything we might write. T he fact that Durco KA2SMo has never failed in use in a sulphite mill should be particularly to you a convincing testimonial. Our counsel and cooperation are based on inval uable years of practical experience with cor rosionprob- lems. They are available free up on request.

Alloy Steel Division

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DURCO
KA2SMo
CARBON 0.07% MAXIMUM

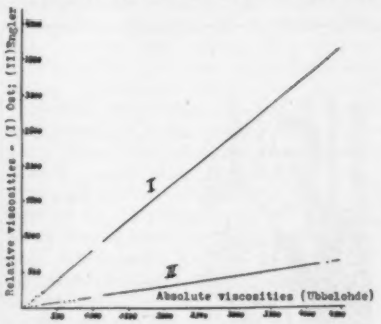
TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

IN THE PAPER INDUSTRY

◆ Absolute and Relative Viscosities

The author has investigated the absolute viscosities (recorded in centistokes and centipoises) of a large number of pure organic liquids and also of various oils. The new Ubbelohde viscosimeter was used (a full description of which is given in Druckschrift der Internationale Petroleum Kommission, No. 18, 810 (Feb. 11, 1933). These viscosities (in centistokes) range from 1.79 (for acetophenone) to 4289 (for citronellalhydrate) and the accuracy and ease of manipulation of the instrument is commended. At the same time the relative viscosities of these various substances were determined by both the Ost and Engler instruments, and as the graph shows, there is a linear relationship between these results and those obtained by Ubbelohde's technique. In the appended figure, (I) indicates the absolute kinematic Ubbelohde viscosities plotted against the relative Ost data, while (II) gives the same relationship for the absolute Ubbelohde and the Engler vis-



cosities. In other words, this study clearly indicates that with the Ost instrument an accuracy quite ample for all practical control purposes may be obtained. This was brought out when the viscosities of cellulose xanthogenates (from various pulps) and of plant extractives were examined by the two methods. Here the Ubbelohde data (in centipoises, taken at 20 deg. C.) check very closely with those obtained by the Ost method at 15 deg. C. All these data, including a long list of viscosities, are fully tabulated. A. Noll and Fritz Bolz. Papier-Fabr. 33, (T.S.) 193-7 (1935).

◆ Steam Chest for Drying Cylinders

As shown in Fig. 1, the short tube (1) is adfixed to the bearing of a drying cylinder. An elbow (4) is joined to the tube (5) through which steam is introduced, and tube (6) the line through which the condensate is drawn off. A ring of specially prepared carbon, is inserted between (1) and (4) in such a way that its flat surface rests against (1) and its convex surface against (4), thus permitting a tighter joint, when expan-

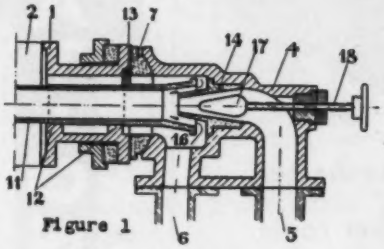


Figure 1

sion is caused by (5) and (6). Using the minimum pressure, two bolts (8) serve to force (4) against (7), the latter thus contacting (1). To secure flexibility in regulating this pressure, a spring (10) is inserted between the screw nuts of (8) and (4), as shown in Fig. 2. Regulation of the tightening through (8) is such that if the steam pressure exceeds a predetermined value, the steam escapes and the chest functions as a safety valve. Steam is introduced through the pipe (11) which revolves with the dryer to which it is joined by (13) as shown in Fig. 3. Pipe (11) is held in a position concentric with the bore of the shaft by the use of three guides (12). The water condensed in the dryer is recovered by a ladle which also revolves with the cylinder. After having passed through (1) this condensate enters the suction line (6). To obviate the usual mechanical difficulties in securing the freedom of motion of the elbow (4), the steam is introduced into (11) through a nozzle (14), a form of ejector, giving rise to strong suction in the direction shown by the

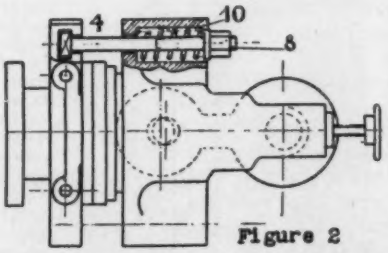


Figure 2

arrows (16) within the annular space formed between (14) and (11). This allows for the recovery of residual steam from the condensates, this steam recirculating through the dryer again furnishes more utilizable calories, until the condensation is complete. Thus the steam supply in contact with the interior surfaces of the dryers is increased, and heat exchange is much more effective. In the case of a number of drying cylinders, the invention permits the regulation of the entry of steam into each cylinder, so that the drying of the sheet follows a rational curve. This is achieved by a steam check valve (17) within the nozzle (14) since (17) may be moved

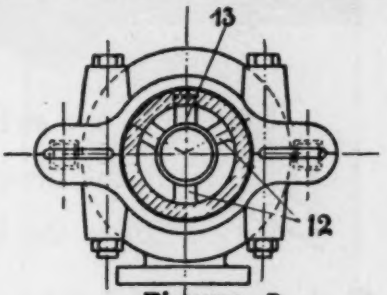


Figure 3

backwards or forwards at will by the regulating screw (18). Line (5) is also provided with a valve which can check completely the steam flow into this line. Henri Breton. French Patent No. 784269.

◆ Paper Strength in Theory and Practice

This is the direct result of the study of control data secured over a period of ten months at the Papyrus paper testing laboratory of the Waldhof Paper Mills. Using this material, which involves largely tearing lengths and folding endurance of the product, the author has sought to gain a deeper insight into the influence of the conditions existing at different stages of the manufacturing process on the strength of the sheet at these points, and on the strength of the finished product. The usual bursting strength tests were not incorporated into the study, which was carried out with two kinds of slow stock (70-75 deg. S.R.) and with three types of free stock (35-40 deg. S.R.). In the preparation of the graphs, summarizing the work, the author used the arithmetic mean (M) of strength tests carried out with strips cut in the machine direction (l) and the cross direction (q). The strength ratio (l/q) was found important and was termed the Verhältnisszahl or (Z). Since Zq=1, and q=2M(Z+1), then 1 =Z [2M/(Z 1]. When the number of folds in a strip are plotted against various weights of paper (in g/m²), it was found that the maximum folding endurance was within the range of 55-70 grams/m²). According to mill data, the weight per volume (i.e. g/m²) of the finished sheet does not increase linearly

pH . . . . . at the beater
. . in the bleacher room
. . or in the laboratory

Coleman pH Electrometer

• Self Contained • Direct Reading
Factory Sealed Glass Electrode

The heavy walled Glass, and also Reference electrode, are filled and hermetically sealed at the factory. The glass electrode may be used, with few exceptions, in practically any solution, gaseous, turbid, oily, colored, strongly alkaline or acid.

Direct pH readings are taken from a dial with nine-inch scale, graduated in 1/10th pH, sensitive to 1/5th of a division.

• No Storage Battery Is Needed
• No Reflecting Galvanometer Required

The Coleman pH Electrometer is readily portable, rugged and suitable for laboratory or plant. It is housed in a beautiful walnut cabinet 12" x 9" x 9", with leather handle and requires no accessories except distilled wash water.

SEND for October issue, WACO CATALYST, for more complete description of the Electrometer, as well as other pieces for Paper testing . . . or we will gladly accept your order for a five-day free trial in your laboratory. It is No. 3535P, costs $125.00 complete, ready for your most critical test.

Sole Distributor

Wilkens-Anderson Company

"Laboratory Apparatus To TAPPI Specifications"

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Here are three S. W. W. bed plate patterns — abrasive-steel combination plate at the top—diamond pattern in the center—S. W. W. standard elbow pattern below. We also are prepared to build plates to customer's designs and specifications. They are all in general demand which bespeaks their reputation throughout the industry.

Also an extensive line of beater bars in standard and special types. Likewise bars to meet special requirements forged out of carbon alloy steels, stainless steel and bronze.

Paper trimming knives, chipper knives, Dayton roll bar grinders and Dayton abrasive wheels.

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Americans are proud of the industrial achievements that have made their brawn, courage and ingenuity world famous. The chief disease which threatens that supremacy is tuberculosis. It is the greatest cause of death between the ages of 15 and 45. Help protect American man power from this enemy by purchasing the Christmas Seals that fight it all year round. The seals you buy today may save your life tomorrow.

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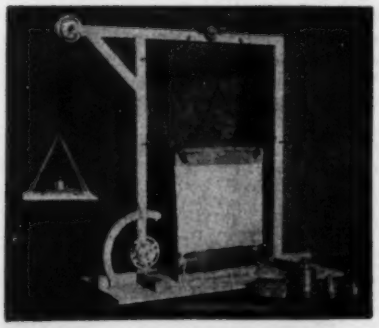
The National, State and Local Tuberculosis Associations of the United States

with the amount of stock that flows on the wire per unit time. Such curves follow courses somewhat similar to those of the fold-wt./vol. curves. The tearing length however in general increases linearly with the increase in g/m². In other words, the tearing length measures the fiber felting over the entire area of the sheet, while the folding endurance test deals with a very restricted area of the sheet and really gives a measure of the behavior of individual fibers. The folding endurance test thus becomes ex-



ceedingly valuable as an index of the relation between fiber orientation and paper strength. This is simply one instance of its importance. With slow stock there appears to be a relationship between the swelling (or shrinkage) of the pulp fibers and the strength of the finished sheet. Moisture determinations on the sheet entering the dry end of the paper machine supports the theory that shrinkage (which is at its maximum with papers that retain the largest amounts of water) may be gauged from folding endurance data. By special equipment (fully described in the original) samples of the moving sheet were taken from those sections of the paper machine that were accessible. This permitted a study of the mechanical influences on the strength of the sheet at the various stages of its production. The effect of tension during manufacture was also studied. With tension in a definite direction and pressure applied in this same direction, in the wet end of the machine, there appears to be an increase in both tearing length and folding endurance. A decrease in stretch is correlated with an increase in tearing length. An interesting difference was noted between slow and free stock, after passing through the dryers. The former shows a lower folding endurance than the latter, due to the marked shrinkage of the more highly hydrated pulp. Laboratory test sheets were used in gauging the stretch of moist paper. The apparatus is shown in the accompanying figure. A wooden frame carries two guide pulleys of which one is connected by means of a string with a pointer operating over a guide scale. Over either pulley runs a thread, at one end of which hangs a small platform on which weights may be placed. The other end is attached to a hook from which hangs a brass clamp. The moist test paper sheet (the formation and removal of which from the sheet machine are adequately described) is held by this and a similar clamp directly below the first. (A moisture determination is made on an aliquot part of the sheet.) This sheet is clamped into place, then just drawn taut (without placing it under tension) by adding weights to the balance platform, thus very cautiously raising the upper clamp which holds the sheet. The pointer is now on the zero mark of the dial. Thereupon, more weights are gradually added to the loading platform, and the stretch is measured in percentage elongation of the sheet, which is plotted against the weight under which the elongation takes place. The lower the water retention in the sheet, the lower the percentage stretch. The importance of the stretch of this sheet at various points of the machine during actual paper manufacture is stressed. The author has included 13 typical graphs, illustrating his results. Fritz Haury. Wochbl. Papier-Fabr. 66 (Tech. Teil) 512-5; 545-8 (1935).

◆ Mechanical Treatment of Pine for Paperboard

After the extraction of rosin from two different American pine woods (the irregularity of splinters and chips of which may be gauged from Figure 1, which shows the better of the two samples), the material was subjected to various mechanical treatments. From the industrial standpoint the following, at present, appears to offer the cheapest and most promising results: the wood is soaked for 72 hours in cold water, then mechanically handled in an experimental kollergang, and subsequently hydrated in a beater. The period during which the wood remains in the koller-

Figure 1

gang is determined by comparing the product with a standard pulp sample. Beating was carried out at a consistency of 5-6 per cent and this was followed by further mechanical disintegration. A photomicrograph (Figure 2) shows a typical tracheid after such treatment of the better of the two wood samples. Following this, small paperboard samples were made on a Schopper-Possaner sheet machine without any attempt at screening the pulp. The boards are dehydrated in a hydraulic press at 75 atm. pressure. In the case of this wood at least the physical properties of the

Figure 2

paperboard closely resemble those of the cheaper forms of commercial board. Other photomicrographs and full tabulated strength data are given. The author emphasizes the fact these are simply preliminary experiments which require large scale verification, before final conclusions are drawn. E. Munds. Wochbl. Papier-Fabr. 66, 493-5 (1935).

◆ Mechanism of Wood Decay

It is generally understood that decay in wood is the result of the action of micro-organisms. The present authors, however, after surveying the literature, define decay as the effect of any natural agency which changes the total or relative amounts of the major components of wood. Such components would include cellulose, the hemicelluloses and lignin. Among the decay producing agencies is the organic substance calcium bicarbonate, the behavior of which towards elms, spruce and tulip woods was studied. In each case 10 grams of finely divided wood were mixed with 2 grams of $CaCO_3$ and 25 cc. of water at 65 deg. C. (Evidently no attempt was made to keep the material sterile.—Abstractor.) Subsequently the mixtures were treated with carbon dioxide until absorption was complete. Control experiments were also run in which the wood samples were simply treated with water at 65 deg. Careful analyses of the original wood, and of all residues (i. e., the products of the calcium bicarbonate treatment and of the control

When you Stretch a Rubber Band

What Happens?

Much the same as happens when plastic metal contracts against a sand core. Both are highly stressed in tension, and both may break. But, if the core in a casting is eliminated, contraction may proceed unrestrained. Cooling strains are avoided, wall sections can be made much lighter, yet stronger. MISCO **"Centricast"** Products are made without cores. THE LIGHTEST WALL SECTIONS ARE SOUND. That is one reason why MISCO **"Centricast"** Products will serve you better.

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Your inquiries are invited.

MISCO "B" "Centricast" cylinder 10¼" OD x 9¼" ID x 16' long.

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FELTS

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The Waterbury Felt Co.
SKANEATELES FALLS, N. Y.

Ask OUR ENGINEERS to help SOLVE YOUR Problems

Paper Mill Equipment

Flat Pulp Screens	Paper Machine Drives
Winder Shafts	Refiners-Hydraters
Cylinder Moulds	Gate Hoists
Deckers	Grid Unit Heaters
Roll Heading Machines	

Pulp Mill Equipment

Agitators	Rotary Incinerators
Flat Screens	Disc Evaporators
Deckers	Recovery Systems
Sulphur Burners	Grid Unit Heaters

Wood Room Equipment

Slashers	Chippers
Barking Drums	Chip Screens
Wood Cleaner	Chip Crushers

Equipment must keep in step with the modern advancement of the paper industry. Our engineers are constantly working toward that end, and paper making problems are anticipated by them. Write for descriptive folder on any particular machine or the complete Murray line—or tell us your problem.

D. J. Murray Mfg. Co.
WAUSAU ~ WISCONSIN.

samples) showed that in those which had been treated with $CaCO_3$ and CO_2, there was an appreciable loss of lignin, an increase in alkali-soluble matter, and in the case of elm and tulip woods, a decrease in Cross and Bevan cellulose. These appear to be cases of decay because of inorganic infiltration. However, the present authors' work has not been unchallenged. For example, Campbell, Taylor, and Bryant (cf. J. Soc. Chem. Ind. 54, 103-5T, 1935), on the basis of their experiments, claim that calcium salts acting independently of micro-organisms are incapable of causing chemical disintegration. In certain woods, tannins are known to inhibit decay. It is possible, according to Campbell and his co-workers, that in the presence of calcium salts, calcium tannate is formed, and that this may actually favor the growth of fungi. Thus calcium bicarbonate acts only indirectly in causing decay. This criticism, the present authors have sought to refute. Ernest A. Rudge and Harold Lewis. J. Soc. Chem. Ind. 54, 302-5T (1935).

◆ Imperviousness of Paper Towards Water Vapor

This article describes in detail, an instrument for the quantitative determination of imperviousness of paper towards atmospheric water vapor. As shown in Figure 1, a test sheet with an exposed surface area of 2 sq. dm.

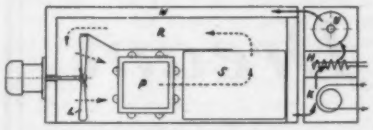


Figure 1

has been stretched securely over an exceedingly shallow pan (P) containing a felt thoroughly wet with water. Since the volume between the under surface of the sheet and the upper surface of the felt is only a few cubic centimeters, the air within the sealed container has a 100 per cent humidity. The air circulating through the outer chamber, in which (P) is placed, is driven by the fan (L) at a definite velocity of 3 meters per second, and passes over the glass container (S) which contains moist ammonium nitrate, thus insuring an outer humidity of 65 per cent. (W) shows the water jacket of the chamber, and the temperature of the entire box is maintained at 65 deg. C. by the integrated functioning of a cooling device (K) and a water heating device (H). A mercury contact thermometer, serves as automatic temperature control with a maximum variation of plus or minus 0.2 deg. This is shown in Figure 2, which is a halftone of the entire instrument. (U) is the circulating pump for water, and (Ps) shown in Figure 2 is a psychrometer for controlling the humidity. In Figure 1, (R) is a channel for the recirculation of air. The course of the latter is indicated by arrows with broken lines; the water circulation is shown by means of arrows with unbroken lines. The humidity of air contacting the outer surface of the test sheet may be varied by a suitable choice of other salts, or inorganic chemicals. For example, if a high outer humidity of 97 per cent is

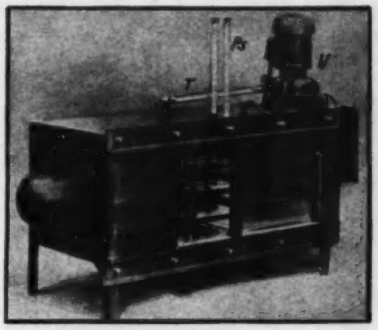


Figure 2

desired, moist K_2SO_4 may be used. If an outer humidity approaching zero is to be obtained, dry P_2O_5 is employed. Intermediate humidities can be obtained, and the author gives a useful list of compounds, and the atmospheric humidity corresponding to each. After the test sheet has reached an equilibrium with the moisture in (P), the latter is weighed and is placed in the humidity chamber. Thereupon, at intervals which depend on the perviousness or imperviousness of the sheet (P) is removed and the weighings are repeated, and the loss in weight is recorded in grams per square decimeter per hour. This loss serves as a quantitative measure of the transmission of atmospheric water vapor under the conditions of the experiment. A special, rapid balance shown in Figure 3 is used for weighing the pans (P). Tabulated records of water vapor transmission for various samples (at the standard humidity of 65 deg.)

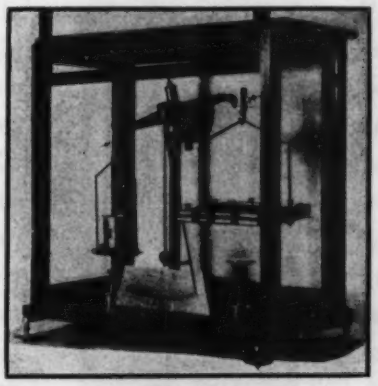
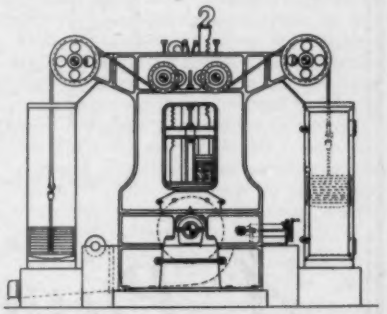


Figure 3

are given. They vary from 0.66 grams per sq. dm. per hour in the case of unsized cigarette papers, to a complete imperviousness of 0.00 grams per hour in the case of special waterproof papers. Data for various textiles are included. The humidity chamber may also be used for the rapid conditioning of paper sheets to a definite percent humidity. The entire apparatus serves equally well in testing the imperviousness of foils, leather, and other similar materials. The mechanics of water vapor transmission are briefly but adequately discussed. Wilhelm Staendel. Wochbl. Papier-Fabr. 66 (T. S.), 224-228 (1935).

◆ Results of Wood Grinding Experiments

An article furnishing very complete data obtained from the Papermaking Institute of the Technical School at Darmstadt. The figure shows the experimental grinder used by the author in the hot and cold grinding of spruce bolts under very carefully controlled conditions. A series of graphs furnish a quantitative record of the influence of pressure, peripheral speeds of the pulp stone, the area of the zone of contact between wood and stone, of the temperature and stuff density in the grinder pits, on the energy requirements in grinding and on the slowness, bursting strengths, tearing lengths, densities, smoothness numbers and poroseties of



the resultant pulp. The results indicate that the temperatures in the grinder pits are evidently of importance and the control of the temperature of the water used in the flushing, the stone (Spritzwasser) is more essential than are the changes in the stock density in the pits. The work is presented systematically and evidently presents a major piece of research. W. Brecht, Papier-Fabr. 33, No. 13 (T. S.), 113-118; No. 14 (T. S.), 121-127; No. 15 (T. S.), 129-30 (1935).

◆ Acid, Basic and Direct Dyes

This excellent series of reviews deserves only a brief mention, since no new experimental data are presented. In general, the acid dyes with certain exceptions, are soluble, lightfast, and proof against alkali and acid. Mordanting (with alum) is essential, since cellulose alone does not fix the dyestuffs (Cf. Papeterie, 57, No. 1, 2-9; No. 2, 50-4 (1935)). Basic dyes, despite their brilliancy, and high tinctorial power, are not fast to light (Cf. Papeterie, 57, No. 7, 294-8; No. 8, 345-6 (1935)). The direct or substantive dyes while usually quite expensive are widely used. In this article (which is to be followed by others) the author outlines the use and resistance of various direct yellow, orange, brown and red dyes, and in some instances gives the intermediates required in their production. Maurice Déribéré. Papeterie, 57, No. 17, 785-9 (1935).

A Papermaker's Dream

Is there a machine tender who has not dreamed of the day when "breaks" would be few and far between; and when he could tend his machine with the least amount of physical effort? ● Some time ago, twenty-one months to be exact, a machine making lightweight sulphite tissue was having plenty of trouble. Breaks were frequent and there was much grief for the machine tender on each shift. ● This condition was eliminated at that time through the installation of a FRITZ

REFINING AND HYDRATING MACHINE. Immediately after this machine was placed in operation, the paper machine operated for sixteen hours without a break. Certainly this was some improvement over previous operating practice—an improvement due only to a better preparation of the stock. ● If you are anxious to decrease the quantity of your "broke" and improve the quality of your sheet, write for complete information. LOVE BROTHERS, Incorporated, Aurora, Illinois, U.S.A.

PAPERMAKING PATENTS

IN THE UNITED STATES

Inquiries with reference to any of these patents should be addressed to James Atkins, Munsey Building, Washington, D. C.

Compiled by James Atkins, Registered Patent Attorney

2,014,815—Method of and Means for Making Pressed Plates, Dishes, and the Like. Robert E. Rutledge, Kalamazoo, Mich., assignor to Sutherland Paper Company, Kalamazoo, Mich. Original application January 20, 1934. Serial No. 707,481. Divided and this application May 4, 1934. Serial No. 723,899. 4 Claims. (Cl. 113—46). The method of forming paper dishes from circular blanks of fibrous material consisting of pressing into dish form and simultaneously forming an annular bead in the bottom adjacent and merging into the side wall with a reverse curve, radial inwardly tapering ribs extending inwardly from the bead and merging into a flat central portion of the bottom, and a down-curved rim with uniformly spaced inwardly tapered flute-like corrugations extending inwardly from the edge of the rim and fading out adjacent the bottom the side wall. In an apparatus for forming dishes from paper blanks, the combination of a dished female die having a side wall portion provided with curved edge and radial inwardly tapering flute-like corrugations extending inwardly from the edge and fading out at a point above but adjacent the bottom of the die, the bottom of the die having an annular rib adjacent the side wall merging into the side wall with a reverse curve and inwardly tapered radial ribs extending inwardly from the annular rib and fading out in substantially spaced relation to the center, a co-acting male die comprising an annular outer member having corrugations complementary to the corrugations of the rim portion of the female die, and an inner member having a face complementary to the bottom and side wall portion of the female die, means for actuating said die members, and means for yielding supporting the outer male die member relative to the inner during the initial portion of the closing stroke of the dies whereby the outer male die member is brought into engagement with the work prior to the engagement thereof by the inner male die member.

2,015,139—Screen Plate for Paper Making Machines. Frank Dustan, Fitchburg, Mass., assignor to William A. Hardy & Sons Co., Fitchburg, Mass., a corporation of Massachusetts. Application May 3, 1934. Serial No. 723,759. 3 Claims. (Cl. 92—30). A screen plate comprising a series of longitudinal sections of slitted sheet material having integral, vertical, downwardly extending side flanges spot welded together, side sills welded to the outer side flanges, and filling blocks welded into the end of each section between its flanges.

2,015,140—Screen Plate for Paper Making Machines. Frank Dustan, Fitchburg, Mass., assignor to William A. Hardy & Sons Co., Fitchburg, Mass., a corporation of Massachusetts. Original application May 3, 1934. Serial No. 723,759. Divided and this application October 3, 1934. Serial No. 746,687. 3 Claims. (Cl. 92—30). As an article of manufacture, a screen plate comprising a series of slitted channel plates of thin strong non-corrosive metallic material, each sheet extending across the plate, their adjacent flat edges being butted together and their side edges extending downward, cross strips under the joints between adjacent plates and welded to them, and side sills welded to the down turned side edges.

2,015,141—Screen Plate for Paper Making Machines. Frank Dustan, Fitchburg, Mass., assignor to William A. Hardy & Sons Co., Fitchburg, Mass., a corporation of Massachusetts. Application October 3, 1934. Serial No. 746,688. 4 Claims. (Cl. 92—30). As an article of manufacture, a screen plate for the purpose described, comprising a pair of side sills, a pair of end pieces, a plurality of sections of sheet metal, each provided with two downwardly extending flanges arranged transverse to the long dimensions of the screen plate, said side sills having notches cut from one side to the other in which said flanges are located, the channel members, of which the sections are made up, having their vertical flanges welded together side by side and extending to the outer sides of the sills and welded thereto.

2,015,202—Method of Forming Boxes. John S. Stokes, Huntingdon Valley, Pa., assignor to Stokes and Smith Company, Philadelphia, Pa., a corporation of Pennsylvania. Application January 14, 1932. Serial No. 586,530. 38 Claims. (Cl. 93—43). The method of making a box which comprises flattening sheet material upon a conveyor surface, moving a scored blank adapted to form at least two box panels along a path into adhesive, registering engagement with the sheet material flattened upon said surface, at a point in said path bending the blank along its scoring, and conveying the blank and attached sheet material by said surface toward a box-forming station.

2,015,359—Ply-Wood, Laminated Paper Board, or Similar Composite Article. John D. Carter, Lansdowne, Pa., assignor to Philadelphia Quartz Company, Philadelphia, Pa., a corporation of Pennsylvania. No Drawing. Application April 4, 1933. Serial No. 664,335. 8 Claims. (Cl. 154—40). The method of making ply-wood, laminated paper board or similar composite articles which includes treating a ply with an alkali restraining solution and uniting the plies with a silicate of soda adhesive.

2,015,426—Method of Molding Articles from Pulp Material. Arthur C. Gough, Fitchburg, Mass., assignor to Charles F. Cowdrey, Jr., Fitchburg, Mass. Original application March 3, 1933. Serial No. 659,470. Divided and this application October 18, 1933. Serial No. 694,048. 4 Claims. (Cl. 18—59). The method of making a closure for containers which consists in molding cup shaped outer member and a similar cup shaped inner member each with a depending skirt, forming a central bulge on each of said members extending within the confines of their respective skirts, assembling the two members in superposed relation, then subjecting the assembled inner and outer members to pressure to unite the two while the pulp material is in a wet or moist condition, and subjecting the bulges of both members to a reverse bulge bending pressure to form a sealing rib of double ply.

2,015,531—Roll Coating Machine. William J. Montgomery, Hamilton, Ohio, assignor to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio. Application July 25, 1932. Serial No. 624,589. 5 Claims. (Cl. 91—48). In a web coating machine, the combination with a doctor roll and a cooperating web carrying roll and means for driving these rolls in the same angular directions, of means for applying cleaning liquid across the whole length of the carrying roll and means to remove substantially all of the liquid thus applied prior to contact with the web.

2,015,877—Revolving Paper Knife. Victor T. Thompson, Montevista, Colo., assignor to Harold E. Thompson, Camas, Wash. Application December 3, 1934. Serial No. 755,786. 6 Claims. (Cl. 164—70). A revoluble circular paper roll cutter comprising in combination a shaft, a pair of sharp edged discs on the shaft, a circular spacing member between said discs, teeth on said spacing member arranged with their points on a circumference that is concentric with but smaller than the circumference of the discs and means for clamping the discs and saw in position for unitary operation with the shaft.

2,017,191—Sheet Handling Machine. Paul R. Whelan, St. Louis, Mo., assignor to David O. Royster, St. Louis, Mo. Application September 12, 1932. Serial No. 632,716. 27 Claims. (Cl. 271—3). Sheet-handling mechanism comprising sheet-inverting means, sheet-positioning means, and intermittently actuable means for feeding an inverted sheet to the sheet-positioning means.

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It is illegal outside the Irish Free State to print Irish Hospitals' Sweepstake Tickets or Receipt Blanks, or to manufacture or use for printing, paper watermarked with the words

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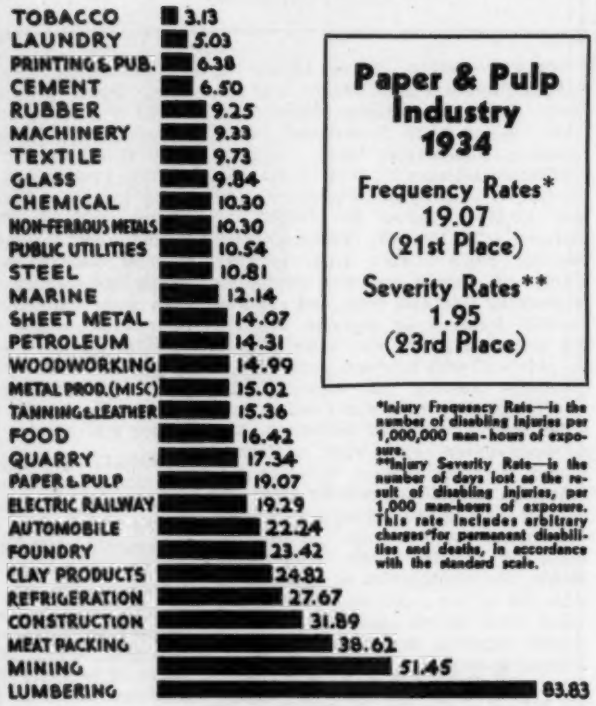
The HIGH *and the* LOW *of* INDUSTRIAL ACCIDENT RATES

(1934 injury frequency rates of National Safety Council reporters)



Paper & Pulp Industry 1934

Frequency Rates* 19.07 (21st Place)

Severity Rates** 1.95 (23rd Place)

*Injury Frequency Rate—is the number of disabling injuries per 1,000,000 man-hours of exposure.
**Injury Severity Rate—is the number of days lost as the result of disabling injuries, per 1,000 man-hours of exposure. This rate includes arbitrary charges for permanent disabilities and deaths, in accordance with the standard scale.

During 1934, out of the 30 major industries, there were only 9 that had a higher accident frequency rate and only 7 that had a higher severity rate than the Paper and Pulp industry. These statistics definitely prove many firms producing paper and pulp are having hundreds of needless accidents. They also prove this industry is paying out huge sums of money every year in accident costs.

The National Safety Council welcomes the opportunity of helping the paper and pulp industry reduce accidents.

We will be glad to explain in detail our service to any firm not familiar with this important factor of industrial operation. In writing for information please give average number of employees.

National Safety Council
(INCORPORATED NOT FOR PROFIT BUT TO PREVENT ACCIDENTS)
20 North Wacker Drive, Chicago

The COMMERCIAL OUTLOOK

New York, November 1, 1935.

NOT in a long while have paper mills enjoyed such activity as at present. From all quarters in the industry reports tell of substantial improvement in market conditions, obliging paper and board mills to gradually increase their operations until the industry is now on a larger production basis than in some years. The broader demand for paper is general; practically all lines have been affected, and some groups of mills are running at full or very close to full capacity. Moreover, the situation is of very healthy character. Paper manufacturers are not producing promiscuously but are gauging their output by the scope of demand for their product, and it can be said nearly all the paper and board now coming off the machines is finding its way almost immediately into consuming or converting channels.

The outlook is considered highly favorable. General business has continued to register expansion during the last month. All indices, industrial and commercial surveys, and basic statistics show that not only is the improvement of recent months being sustained but additional gains are being recorded. The Federal Reserve Board's adjusted index of factory employment for September was 81.9, based on the 1923-25 average, compared with 81.7 in August and 74 a year ago. The payroll index rose from 69.6 in August to 72.1 in September, and compared with 58.0 in September last year. The adjusted index of industrial production was 88, against 87 in August and 71 a year ago, while the index of manufacturers also was 88 in September, contrasted with 87 in August and only 69 in September, 1934. Freight carloadings are showing a consistent rise, department store and other retail sales are increasing appreciably, building construction is gaining in most sections of the country, security sales are increasing and at mounting prices, and in just about every direction are concrete indications of steady and material improvement in trade and industry.

A development of prime importance within the paper industry is the virtual establishment of the contract price for standard newsprint for 1936. An increase of $1 a ton in the newsprint basis for next year was announced by the Great Northern Paper Company on October 11, making the quotation for 1936 contracts $41 per ton. While the general expectation at least within the paper industry, was for an advance of $5, or certainly not less than $2.50 a ton, this action on the part of one of the largest United States manufacturers of print paper has since been commonly accepted as establishing the market level for next year.

Reports from Canada say that the $41 newsprint price was a distinct disappointment to paper mill executives there, it being felt that increased costs along with other factors fully warrant a rise of at least $2.50 to $3 a ton over this year's basis. It is pointed out that for most newsprint companies in Canada production costs will be nearly $3 a ton higher next year, due to accumulated woodpiles having been used up and costs in woods operations having increased. At the same time, the fact that the initial announcement of an increased price came from a purely American company —and a relatively low-cost producer at that—is pointed to as further evidence that higher prices are looked upon generally in the industry as absolutely essential and fully justified on the basis of economic factors. It cannot be stated definitely as yet that the Great Northern price announcement will set the scale for the entire industry, although prospects favor this. Due to the nature of newsprint contracts, the lowest price at which newsprint is sold sets the level for the entire industry.

Newspaper advertising gained almost 4 per cent in September compared with a year ago, Advertising Age reports. Linage figures for 82 representative cities showed an increase of 3.9 per cent, or 5,321,000 lines, the total being 142,446,000 lines, against 137,125,000 lines. A slow but steady improvement in advertising volume in 1936, amounting to about 5 to 10 per cent over that of the current year, is forecast by advertising executives, following analyses of budgets now being drawn up.

Canadian mills in September continued to turn out more newsprint than for several years, and production in that country rose 12.4 per cent during the month. The downward trend for output in the United States, however, was unchecked, and domestic mills produced 3.6 per cent less print paper than a year ago, according to reports to the News Print Service Bureau. For both countries production was up 9.3 per cent in September over a year ago.

Newsprint output in Canada in September was 223,892 net tons, against 196,172 tons in September last year, while mills in the United States manufactured 71,416 tons, against 74,117 tons. Mills in both countries produced 295,308 tons, compared with 270,289 tons a year ago. The output of Canadian mills in the first nine months of this year totaled 1,978,634 tons, against 1,881,918 tons in the similar 1934 period, while U. S. mills produced 681,263 tons, contrasted with 719,675 tons last year. Both countries produced a total of 2,659,897 tons in the nine months, against 2,601,882 tons a year ago. In both countries shipments exceeded production, Canada shipping 225,403 tons and United States mills 73,161 tons in September, as a result of which stocks at mills in both countries on September 30 declined to 90,308 tons, contrasted with 93,564 tons a month previously, and comparing with 85,605 tons on September 30, 1934.

Paperboard mills in the United States produced 15.7 per cent more board during the first nine months of the current year than in the same time of last year. Output this year in the nine months aggregated 2,410,575 net tons of all kinds of board, against 2,082,138 tons a year ago, mills producing at 66.5 per cent of their rated capacity, compared with 59.4 per cent in 1934. The September output amounted to 289,596 tons of board, contrasted with 291,127 tons in the preceding month, and 233,426 tons in September, 1934. While smaller in total tonnage during September than in August last, the production of board in September was at a greater rate of mill capacity or 74.1 per cent, compared with 68.7 per cent in August, board mills producing at a higher percentage rate in September than in any month in more than two years, or in August, 1933, when they produced at 77.3 per cent of rated capacity.

New orders received by manufacturers during September called for a total of 307,103 tons of board, a bigger volume than in any month since August, 1933, and comparing with 297,349 tons in August last. Unfilled orders for board held by mills at the end of September were for 105,088 tons, against 86,767 tons a month previously, and comparing with 72,930 tons a year before.

◆ ◆

◆ Armco's Chief Executive Honored by Steel Institute

George M. Verity, Chairman of the Board, The American Rolling Mill Company, who recently resigned as a member of the Board of Directors and the Executive Committee of the American Iron and Steel Institute after having served the Institute many years, has been elected Honorary Vice President of that organization.

This action was taken by the Board because of their very sincere appreciation of the devotion which Mr. Verity has shown to the interests of the Institute and the steel industry as a whole, and the help and support which he has given so freely to all the work of both the Board and the Executive Committee.

◆ V. L. SANDERSON has been appointed sales representative for the American District Steam Company in Philadelphia and the State of Delaware, with offices in the Otis Building, Philadelphia.

TWO eventful years have passed since the last previous Chemical Exposition. Change is the outstanding essence of the interval. The pressure of circumstance and the spur of newly awakening opportunities have wiped out many an accepted standard, ushered in many a new one. Are you fully in touch with the newest in materials, methods and machinery? It is vital that you be thoroughly informed, for only thus can you be sure not to be outstripped.

To be sure you know the newest aids to lower production cost, to higher product quality, new uses for old materials, new materials to replace the old, come to this outstanding biennial exposition prepared to assimilate ideas. You will be well rewarded.

15th EXPOSITION CHEMICAL INDUSTRIES

DECEMBER 2-7, 1935

GRAND CENTRAL PALACE, NEW YORK

Definite Advantages

You will find the Orr a better water extractor—a better felt—reducing to a minimum the work on the dryer.

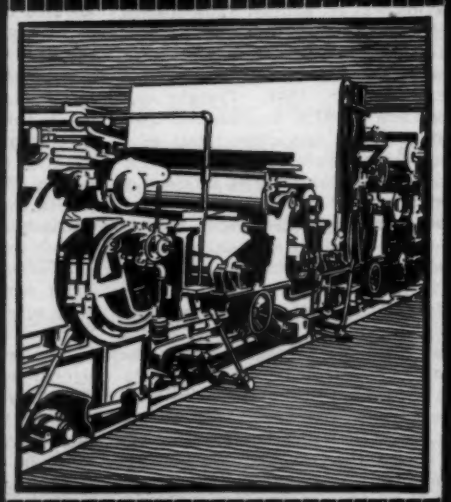
You will find that Orr felts last longer—reducing the annual felt bill by hundreds, perhaps thousands of dollars.

The above statements can very easily be proved—have been proved in mills sufficiently interested to conduct operating tests—first on one make of felt, then on another.

Put on a test in your own mill. Give the Orr brand of felts an opportunity to prove that they are a superior make.

Complete line in all required sizes and weaves, including endless felts for the very largest machines.

The ORR FELT and BLANKET COMPANY
Piqua, Ohio.



ORR FELTS

Domestic RAW MATERIALS

◆ Papermaking Rags

The market for roofing rags has quieted to some extent, a condition usually noted as the end of a year draws near. The final two months of the year are recognized as the slow period for roofing felt, when manufacturers let down in their purchase of raw material. The quietness now observed in the rag market also is doubtless due, in part, to rather heavy buying by mills a month or so ago, the likelihood being they covered their requirements for a time, and, not caring to further excite the market and drive prices up still higher against themselves, diminished their buying to a degree.

However, it is quite evident domestic roofing rags are moving into consuming channels in a fairly steady manner, and at maintained prices following a slight recession in market levels amounting to a dollar or two dollars per ton several weeks ago. Indications are felt manufacturers are absorbing domestic roofing rags freely while neglecting foreign rags. The apparent reason for this is that domestic material is obtainable at costs substantially under the prices asked for foreign rags.

That the fundamental condition of the roofing stock market is one of strength is commonly acknowledged, not alone by dealers and importers but also by felt manufacturers. Consumption has hit the high spots in recent months, and available supplies in this country as well as in Europe and elsewhere abroad have been well drained, until there is a shortage or certainly a near-shortage of such rags now to be had.

Dealers are quoting and receiving 1.40 cents per pound f. o. b. shipping points in the East for mixed satinets or No. 2 domestic roofing rags, while No. 1 roofing rags are bringing 1.70 cents. Importers quote 1.65 cents per pound ex dock New York on foreign dark colored cottons from northern European sources, and insist they cannot afford to take felt mill orders at less owing to the prices demanded from abroad. Foreign linsey garments are generally quoted at 2 cents a pound. Dark cottons of Spanish origin are priced around 1.35 cents on an ex dock New York basis.

Other grades of papermaking rags are in fair demand, more particularly some descriptions of new cotton cuttings, which writing paper manufacturers are taking in good quantity. No further price advancement of consequence has occurred in these rags, but a decidedly firm undertone prevails and buyers are finding it difficult to secure supplies at other than quoted prices. No. 1 new white shirt cuttings are selling in the East at 6.25 to 6.50 cents per pound f. o. b. shipping points, fancy shirt cuttings at 2.50 cents, unbleached muslins at 7 cents, blue overall cuttings at 5 cents, light silesias at 4.75 cents, washables at 2.25 cents, bleached canton flannels at 6 cents, and O. D. khaki cuttings at 4 cents. Old No. 1 white cottons of repacked quality are firm around 3 cents a pound at dealers' shipping points, No. 2 whites 2.50 cents, and repacked thirds and blues 1.75 cents.

◆ Old Paper

Waste paper of nearly all grades is moving readily, more especially to boxboard mills, and prices are steady to firm. Activity in this market clearly reflects the busy condition of the board industry, and there are many in the trade who feel it is just as likely as not demand for waste paper will hold up over the closing weeks of the year notwithstanding that as a rule the market slows down near the year-end. All indications point to the market being well sold up, with little or no accumulation of stocks in dealers' hands, and with consuming mills absorbing supplies about as rapidly as the material becomes available.

Shavings are moving freely, soft shavings in particular, and dealers quote 2.15 cents per pound f. o. b. eastern shipping points for No. 1 hard white, 1.85 cents for No. 1 soft white, 2.10 cents for one-cut soft white shavings, and 2.35 cents for No. 1 hard white envelope cuttings. Ledger stock has taken a spurt upward in price and is selling at 1.15 cents a pound for white and 85 cents per hundred pounds for colored, with mills requiring extra quality packing paying above these figures. White blank news cuttings are firm at 1.40 cents or higher per pound at shipping points, new kraft envelope cuttings are bringing 1.65 to 1.75 cents, and No. 1 old kraft paper 90 cents to $1 per hundred pounds. Folded newspapers are selling at 30 to 35 cents a hundred pounds in the East f. o. b. shipping points, and No. 1 mixed paper at 25 cents, while in the Middle West 37½ cents is the prevailing quotation on both these grades.

◆ Rope and Bagging

Almost anything in the form of old or scrap jute bagging is selling actively and at strengthening prices. Some large consumers have entered the market recently and have bought heavily, in certain cases covering requirements for a considerable time ahead, with the result supplies have been well cleaned up and it is not an easy matter to locate available stock. No. 1 old bagging is fetching 2 cents a pound on a delivered basis at consuming centers, and doubtless above this price has been granted in some transactions. Importers assert they have to secure more than 2 cents delivered to bring in bagging from abroad profitably. Gunny bagging is strong in price at 1.90 cents or more ex dock New York for foreign, and about 1.85 cents at shipping points for domestic. Roofing bagging is firm at 1.25 cents a pound for domestic packing at dealers' points.

On the other hand, there is restricted activity in the old rope market. Paper mills are purchasing in an occasional way but are taking limited tonnage at best while presumably having their needs supplied for a time.

◆ Pulpwood

Pulpwood is steady quotably and in fair demand, although the buying season is over. Wood in the Watertown, N. Y., district is quoted at $12 to $12.50 per cord for four-foot peeled, $15 for two-foot rossed, and $13.50 for handshaved.

◆ Mechanical Pulp

The market for mechanical pulp has registered considerable improvement in point of activity. Consumers are exhibiting much more desire for supplies and are buying in a more consistent manner than in some time. Moreover, prices are showing a stiffening trend. Most of the demand, it is reported, is coming from the Middle West, where consuming mills evidently are more in need of pulp and are purchasing both Canadian and Scandinavian groundwood in larger tonnage. Canadian groundwood is quoted at $21 to $22 per ton ex dock American Atlantic seaboard for pulp brought down by vessels, and in the vicinity of $27 or $28 for rail shipments delivered to western mill centers. Domestic groundwood is nominally 21 to $22 f. o. b. grinding plants. Scandinavian dry groundwood is $21 to slightly higher on an ex dock basis at New York or other Atlantic ports.

◆ Chemical Pulp

Paper and board manufacturers are manifesting substantially more interest in wood pulp, and are purchasing with greater freedom, not alone for prompt delivery but also against requirements some time forward. Pulp mills are busy, and are shipping out their product quickly and in sizable tonnage. Prices are firm, and, if anything, display an upward tendency. Prime domestic bleached sulphite it 2.50 cents upwards per pound, ex dock Atlantic seaboard basis, and the pronounced firmness in prices of such pulp leads some in the trade to expect market advancement. Unbleached sulphite is on a quotable range of 1.85 to 2.05 cents per pound, domestic bleached soda pulp 2.50 cents delivered paper mills, and domestic kraft pulp 2 cents or higher delivered.

◆ Chemicals

Caustic soda is quotably steady at 2.60 cents a pound upwards for the solid product f. o. b. works, and soda ash is 1.20 cents for bag shipments, also at works. Bleaching powder is quoted 1.90 to 2.10 cents per pound at works.

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Import and Export MARKETS

IMPORTS

◆ Wood Pulp

Reflecting increasing activity in the paper manufacturing industry, the market for imported wood pulp is registering considerable improvement. Demand is broader and covering all grades of pulp; paper and board mills are buying with much more freedom, by which is meant they not only are readily covering near and definitely known forward requirements but also are purchasing ahead in sizable volume, and prices are characterized by pronounced firmness.

The market situation gives every sign of growing healthier, technically and otherwise. Certainly, producers in Scandinavia and elsewhere abroad are not exerting much if any pressure to sell pulp to American buyers. In some cases, mills on the other side of the Atlantic have practically withdrawn from the market, at least temporarily and as regards additional sales for next year. Some classes of pulp, kraft in particular, are difficult to get in large tonnage for shipment from primary sources during the next few months. Instances are cited where some of the largest kraft pulp mills in Sweden have stopped offering, for shipment a considerable period ahead, as they have sold all of their production they care to for a time. The supply position of bleached sulphite also is becoming rather tight, especially as concerns prompt or near shipments. Unbleached sulphite, however, is offered relatively freely although many of the popular mill brands, including most of the cheaper lines, are now well sold up.

Prices of kraft pulp have strengthened to the extent where 1.80 to 1.85 cents per pound, ex dock American Atlantic seaboard basis, is regarded as the market quotational level on forward shipments from abroad. Spot lots of kraft have sold at 1.85 cents and in certain instances at 1.90 cents. No longer, it is stated, is strictly prime kraft available for shipment from abroad at the former basis of 1.70 cents, and doubts are expressed that any more supply is to be had at 1.75 cents. Bleached sulphite displays distinct firmness on a quotable level of 2.50 cents upwards a pound, ex dock, depending on grade, with some mill bands quoted at 2.60 and 2.65 cents and higher. Prime strong unbleached sulphite is 1.90 to 2.05 cents a pound on the dock, according to quality. Prime Scandinavian groundwood is quoted at $21 to $22 per short ton ex dock Atlantic seaboard for dry, and a dollar or more per ton above this basis for moist pulp. In frequent cases, mills abroad ask an additional $1 a ton for groundwood for shipment next year, indicating a higher market in 1936.

Imports of chemical pulp into the United States during August just about approximated receipts in each of the previous two months. The August imports amounted to 135,508 short tons of 2,000 pounds, aid dry weight, valued at $5,344,071, according to U. S. Department of Commerce figures, compared with 135,112 short tons of a declared value of $5,179,470 in the month before, and 138,754 short tons of a value of $5,218,499 in June this year. Also, the August arrivals were about on a parity with the 127,557 long tons of a value of $5,131,607 imported in the same month last year. Eight months' receipts this year aggregated 998,156 short tons, contrasted with 916,025 long tons imported in the corresponding time in 1934. Thus, on a net or short ton basis, imports this year are running slightly behind importations last year, the decrease in eight months amounting to 27,792 short tons, or a shade more than 2 per cent.

Mechanical pulp imports in August amounted to 12,768 short tons, valued at $200,723, against 10,460 short tons of a value of $188,856 in the preceding month, and 15,421 long tons of a value of $312,386 in the similar month last year. Groundwood imports in eight months this year totaled 103,637 short tons, compared with 104,034 long tons in the same period of 1934.

◆ Paper Stock

Imports of rags for papermaking into the United States in August last reached 20,429,055 pounds, valued at $315,778, according to U. S. Department of Commerce statistics, making a total for the first eight months of this year of 114,245,583 pounds of a declared value of $1,347,086, and showing a large gain over the 72,974,797 pounds of a value of $896,526 imported in the corresponding period last year. Receipts of other paper stock, including old rope, old bagging, waste paper, etc., aggregated 49,770,899 pounds of a value of $707,093 during the first eight months of the current year, against 37,582,092 pounds of a value of $558,379 a year ago in the similar time.

◆ Paper

The United States imported paper to the value of $7,759,917 in August last, comparing with imports of a value of $7,238,231 in the month preceding, and bringing the total for the first eight months of this year up to a value of $58,281,326, against $56,250,698 in the corresponding eight months of 1934. Newsprint, of course, comprised the great bulk of these imports, the value of the standard newsprint imported in the eight-month period reaching $51,386,439, compared with $49,409,138 last year. Next in the importance of value was cigarette paper, imports of which were valued at $2,593,904 in eight months this year, against $2,842,439 a year ago. Other important items were kraft wrapping, valued at $384,614 this year, against $197,993 last year; tissue paper, valued at $374,638, against $369,198 last year, and surface coated paper, valued at $361,447, against $401,005 a year ago.

EXPORTS

Exports of paper and paper products from the United States are registering a fair increase this year compared with shipments last year. Department of Commerce figures show that exports in August last were valued at $1,716,568, contrasted with $1,807,695 in the preceding month, and $1,805,776 in the similar 1934 month. Exports during the first eight months of the current year were valued at $13,420,987, compared with $12,239,945 in the same time of last year, a gain this year of $1,181,042.

The largest single item in paper exports this year, in point of total value, is wrapping paper, shipments of which in eight months of 1935 were valued at $1,221,517, contrasted with exports valued at $1,153,522 in the same 1934 period. Exports of writing paper were valued at $1,127,608 in eight months this year, against $820,645 last year; of newsprint, $601,249, against $645,001; of uncoated book paper, $646,292, against $604,218; of greaseproof and waterproof paper, $743,695, against $575,049; of overissue and old newspapers, $727,814, against $1,125,617; of tissue and crepe paper, $361,407, against $412,950; of toilet paper, $437,369, against $370,826.

Exports of paper base stocks were valued at $6,467,147 during the first eight months of the current year, including shipments worth $1,716,568 in the month of August, and compared with $4,800,790 in the first eight months of 1934. Sulphite pulp comprised the bulk of these shipments, reaching in value in eight months this year $5,870,385, contrasted with $3,947,059 in the similar period of last year. The United States exported 28,930 cords of pulpwood, valued at $179,785, in eight months this year, compared with 6,000 cords of a value of $30,000 in the same time of 1934.

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